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NEWS SUMMARY

Business

Gold falls \$4½ on IMF sale fears

GOLD fell \$4½ to \$124½, its lowest level for two years on fears of gold sales by the IMF.

WALL STREET closed 6¼ up at 949.85

Turnover, at 35.89m. shares, was above 30m.

Car ferry Lion from Bertha at Gourock on tide

24 hours late. Sailings to the Isle of Man and not were cancelled. Each trawler, which had been reported on fire, helplessly in mountainous the Outer Hebrides last hurricane force winds pre-Barra lifeboat reaching weather. Back Page

Janon title control

Janon and Moslem Left reinforced by thousands from across the Syrian clashed with Lebanese units as they continued to or control of the north of south of Lebanon. Inter- of the reinforcements Syria. Back Page 7

aker is to sign on Feb. 3

slwyn Lloyd is to resign as er of the House of Com- on February 3. With two by-elections pending at N.W. and Carshalton, action in Mr. Lloyd's safe cat will almost certainly the Government's over- ority of one by the end ch. Back Page 8 and Page 14

on charges ladrid

thousand riot police last rapped a substantial area Madrid to prevent a rait called by Spain's Leftwing Opposition Groups demanding a political amnesty dispersed by teargas, bombs and baton charges. and the EEC. Page 6

awaits cod s reply

ain awaited a reply from Hallgrímsson, Iceland's Minister, to its invitation War talks, it became at the Government had no assurances that ent of trawlers would return for withdrawal ships. Page 9. Parliament

ast blasts

ged through Woolworths heart of Belfast after two exploded. The store had leaved following a tele- arming 15 minutes before its.

re lstra

Norwegian supertanker lstra, 224,000 tons, sank a minute of three ex- according to two Spanish s. The search for further s continued in the Page 8

ly ...

viktor Mrs. Laura Lam- ho was criticised in the on the death of baby Meurs is to be moved to nt job by Norfolk health y. Raising, Page 2

PRICE CHANGES YESTERDAY

in pence unless otherwise indicated

11p	£1001	+	1
Bank	86	+	3
Bank	290	+	10
Bank	355	+	7
Bank	37	+	4
Bank	85	+	7
Bank	118	+	5
Bank	60	+	4
Bank	251	+	24
Bank	262	+	4
Bank	22	+	4
Bank	150	+	4
Bank	157	+	4
Bank	282	+	9
Bank	104	+	5
Bank	220	+	4
Bank	54	+	7
Bank	230	+	10

Unemployment trend shows no signs of abatement

Figures for jobless rise to 6.1% post-war peak

BY WILLIAM KEEGAN, ECONOMICS CORRESPONDENT

Unemployment in the U.K. is continuing to rise very sharply, with no signs of any deceleration in the trend. Between mid-December and mid-January the total number of people registered as out of work shot up by an unprecedented 218,911 to 1.43m.—the highest since 1939, and equivalent to 6.1 per cent. of the labour force.

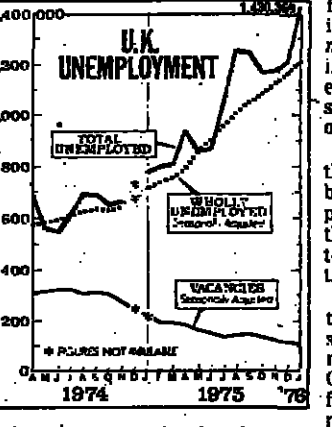
This "crude" figure was once again inflated misleadingly by the inclusion of another 116,438 adult students (in addition to nearly 10,700 last month) who register during vacations in order to qualify for supplementary benefit.

Even after allowing for students and some 40,687 school-leavers on the register, however, there was another steep increase of 42,300 in the seasonally adjusted figure of wholly unemployed to 1,205m. (or 5.2 per cent.)—also a post-war peak.

Official forecasts both from Whitehall and international organisations such as the Organisation for Economic Cooperation and Development suggest that the seasonally adjusted U.K. figures will go on rising to the region of 1.4m. to 1.5m. by the autumn, implying unadjusted totals of some 1.6m. to 1.75m.

It is assumed that if the apparent "bottoming out" in the U.K. recession is confirmed by subsequent output figures, then there may be at least a levelling out in the unemployment trend during the second half of this year.

Those of the Chancellor's Regional map Page 8 • Parliament Page 12 • Editorial comment Page 14



fact that in any case a recovery in employment lags at least six months behind a genuine turning point in output, the initial effects being a reduction in short-time working and more overtime.

Another crucial point, although it is not stated openly by Ministers, is that the unemployment trend and the depth of the U.K. recession are key factors in the strategy in slowdown the U.K. inflation rate.

Meanwhile, it is understood that the inclusion of the adult students in the crude unemployment totals is causing the Government increasing discom- fort. An inter-departmental committee has been examining the problem for some time.

Quite apart from the question of whether the students should be allowed to continue supple- menting their grants with Government money during vaca- tions, there are those who would at least like to remove them from the official register. On the other hand, some of the "purists" argue this would be unfair, on the grounds that, at least during the summer months, Continued on Back Page

Executives feel impact of recession

BY NICHOLAS LESLIE

A MARKED worsening in the employment situation for executives with little hope of an improvement for the growing ranks of jobless executives in the near future—is shown in a survey published to-day.

No executive job category has escaped the recession, according to MSL, the management consultants, who say that over the past two years there has been a 50 per cent. fall in demand. The only bright spot is a boom in demand by overseas employers.

The worsening situation is highlighted by drop in the MSL index—based on job advertisements in five daily and Sunday national newspapers and the Economist—from 55 points to 79 in the final quarter last year. This represented the lowest level of executive demand ever recorded by the index.

Mr. Harry Roff, MSL chairman, said: "All of our evidence suggests that executive redundancies and lay-offs will continue. This is evidenced by the steadily growing number of applications being received from executives who have been displaced or otherwise unsettled by the present crisis and also by the steady flow of inquiries from employers regarding the redundancy counselling services provided by MSL."

Gloomiest

He also felt that the gloomiest feature of the index was the lack of demand for sales and marketing executives, where an upswing is usually the first indicator of an employment recovery.

Even personnel appointments—an area where some stability might be expected, given the increased stress on industrial relations and better communication in industry—have dropped 45 per cent. in the past two years.

Accounting and financial, another sector where resilience might have been expected, has seen demand fall to the lowest level for ten years. Demand is just 53 per cent. of the peak 1973 level.

Computer executives, whose advertised appointments have steadily risen over the years, have felt the draught with a 40 per cent. fall in demand between the first and final quarters last year.

2 in New York

	Jan. 20	Previous
1 month	82,000-83,000	82,000-83,000
3 months	0.95-0.99	0.95-0.99
12 months	7.82-7.92	7.82-7.92

Left-wing unites in call to reflate the economy

BY RICHARD EVANS, LOBBY CORRESPONDENT

LABOUR PARTY fury over the mounting unemployment figures erupted at Westminster yesterday as Government back-benchers demanded early action to reflate the economy.

Mr. Wilson and Mr. Michael Foot, Employment Secretary, faced the angriest criticism from their supporters since Labour regained power, and immediate attempts were made to force emergency debates in the Commons and in the Labour Party.

Tory MPs joined in the criticism of Government policy and Mrs. Margaret Thatcher, the Opposition leader, scored a damaging political point by branding Labour as "the natural party of unemployment."

But it was the Labour reaction that was the more menacing for Ministers, for it showed that the Left-wing, badly demoralised by the Common-Market referendum result, had found an issue on which to unite.

bencher rose to demand early reflation and the introduction of effective import controls as a means of alleviating the worst monthly unemployment figures since the war.

Moves were under way last night to force a Commons debate in order to bring Ministers under further pressure to provide more jobs.

Mr. Selwyn Lloyd, the Speaker, indicated support for an emergency debate. He rejected a request for a three-hour debate on the grounds that this would not give enough time and declared: "This is a matter that should certainly be debated by the Commons for a full day."

The Government has so far resisted all Left-wing demands for economic reflation on the grounds that this would damage the anti-inflation policy, but with more than 6 per cent. out of work, it is expected that Ministers will increase for Cabinet Ministers to take action before the Budget.

Left-wing MPs pointed out after the angry exchanges that what would prove crucial would be the attitude of trade union leaders, who will shortly open talks with Ministers and employers on the future of the counter-inflation wages policy.

Mr. Eric Heffer, Left-wing former Industry Minister, was cheered when he warned Mr. Foot that "positive action" was needed to cut unemployment.

"Otherwise the Labour movement in the country will not stand for it much longer," he warned.

Mr. Foot admitted that the unemployment crisis was "terrible" but like the Prime Minister he stressed that the whole industrialised world was gripped by a recession.

The Government's difficulties were rubbied home when Mrs. Thatcher attacked the "unacceptably high" rise in the number of unemployed and delighted her supporters by declaring: "Judging by performance, which is the only test by which to judge any government, the Labour Party is now becoming the natural party of unemployment."

World-wide

Mr. Wilson said that inflation had been a world-wide phenomenon. He claimed that if he responded to Tory demands for big spending cuts unemployment would be nearer the 2m. mark.

Mrs. Thatcher retorted: "There are no alibis now. You are the head of Government which has the highest unemployment increase since the war. If you are not responsible will you please sack whoever it is?"

The exchanges showed that Mrs. Thatcher and her colleagues were taking a much more aggressive stance against the Government's handling of the economy.

Concorde passenger services take to the air to-day

BY MICHAEL DONNE, AEROSPACE CORRESPONDENT

AFTER 13 YEARS of development, the Concorde—the most controversial aircraft developed since the far-payload passenger services to-day.

British Airways and Air France Concordes will take off from Heathrow and Charles de Gaulle airport, Paris, simultaneously at 11.30 a.m. (12.30 French time) for Bahrain and Rio de Janeiro via Dakar respectively.

Fears of last-minute hitches on the U.K. side because of difficulties over pay for the various grades of workers involved in the aircraft, especially pilots, appeared to be dispelled yesterday.

British Airways has enough management pilots trained to fly the aircraft for the next few weeks, while discussions are completed on an agreement on rates for line-pilots who are members of the British Air Line Pilots' Association.

Talks between British Airways and the union have been under way for weeks. One difficulty has been to find a way round the Government's pay policy, which prevents those already on £8,500 a year from being paid more. Most pilots involved are in this bracket.

It is believed that when an agreement is reached, it will provide for special payments for the "new work" involved in flying Concorde. This would involve an increase in basic pay rates but give Concorde crews enough extra money to ensure an adequate supply of pilots for any expansion in services.

An interim agreement with cabin staff has already been reached, while ground staff have also settled for higher pay within the Government's 55-a-week pay rise limit.

The London insurance market has provided 80 per cent. cover of the £21.5m. cost of the first British Airways Concorde and will provide cover for more than £200m. when all five British way for weeks. One difficulty has been to find a way round the aircraft are in service. The

balance of the initial risk is borne by overseas interests.

Concorde is the most expensive aircraft covered by the London market. The Boeing 747 Jumbo jet is covered up to about £15m., depending on whether a passenger or cargo aircraft is involved.

Passenger liability is also being carried in the London market, which is generally sharing the cover for both hulls and passenger liability between Lloyds and the aviation insurance companies, with a measure of reinsurance in overseas markets.

There has been no difficulty in arranging this insurance, the underwriters having been satisfied by the extent of the flight test and ground test programmes on the aircraft over the past few years.

No special additional cover is being provided for damage from Concorde's sonic boom, since in spite of fears expressed by some environmentalists, it is felt that the risk of damage from this overland is minimal.

Concorde Special Survey Pages 15-30

Largest steel union rejects jobs cut plan

BY LORELIES OULAGER, LABOUR STAFF

THE LARGEST trade union in the steel industry, the Iron and Steel Trades Confederation, yesterday decided that the British Steel Corporation's latest plan for labour economies of £170m. is unacceptable in its present form.

The ISTC executive decided to seek several amendments when the unions meet the BSC for what could be a crucial confrontation on the economy programme to-morrow.

Sir Monty Finniston, BSC's chairman, yesterday asked the unions to let the corporation know before Thursday what clarifications and changes they wanted in the programme. He gave no indication, however, that BSC is prepared for further negotiations with the unions.

Last night it looked as if Sir Monty's request for advance written information could not be met. Negotiators for the unions in the steel industry, which number over ten, will only decide their final reply to-morrow morning, immediately before meeting the corporation.

If the two sides get nowhere to-morrow, as looks likely at the moment, and if the BSC decides to go ahead with implementing its plan unilaterally, massive industrial confrontation looks inevitable.

The ISTC executive will meet again on Friday to consider the outcome of the talks and will discuss at least selective strikes at a number of plants. Strikes now taking place at four Welsh steel plants may be made official. Depending on the atmosphere on Thursday, even national strike action may be considered, although this remains only a remote possibility.

The ISTC refused last night to reveal what amendments it is seeking, but it is believed to be demanding that the corporation drop its claim to the rights unilaterally to declare compulsory redundancies and eliminate premium week-end shifts, which many steel employees work as part of their normal 40-hour week.

The union is apparently unhappy, too, with the BSC's statement that, because of the present 26 pay policy, there can be virtually no pay rises for men undertaking new and extra work drop its claim to the right to allow a reduction of the work-force through natural wastage. In addition, the ISTC is said to want further assurances that the guaranteed working week will be maintained.

A delegation of nine Labour MPs, all from steel constituencies, is to see Mr. Eric Varley, Industry Secretary, about the threatened redundancies in the steel industry.



Sir Monty Finniston (above) supplied for the first time in public yesterday that he may not stay on as British Steel Corporation chairman after his present contract runs out in September. The hint came in a talk to Birmingham Chamber of Commerce, when he referred to the time "in September when I report this glorious life." Back Page

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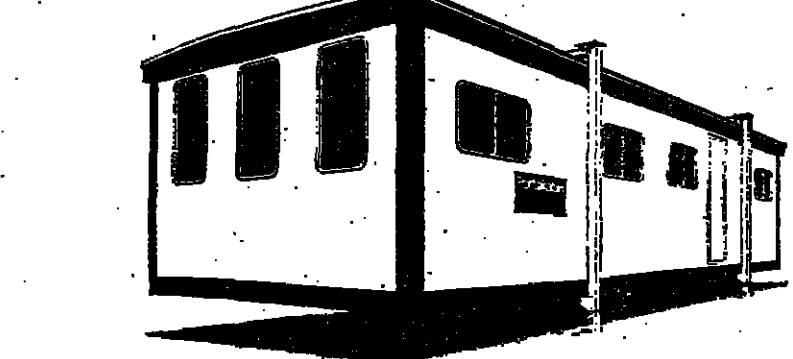
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WORLD TRADE NEWS

SPECIAL STEELS

Japan would react strongly to imposition of U.S. import quotas

BY PETER DUMINY

JAPAN is likely to react strongly to the possibility of U.S. import quotas on some categories of special steel, though no official announcement has been made on the subject and none is expected during the 60 days that President Ford has to make up his mind on the January 17 recommendation by the International Trade Commission (ITC).

The exports which would be directly affected by the proposed 146,000-ton-a-year U.S. ceiling are relatively insignificant. However, the Japanese may regard it as a test case, with protectionist implications for a much larger part of two-way trade. In addition, the U.S. quotas would have

a disproportionate impact on a number of smaller steelmakers which specialise in stainless steel, alloys, and other items.

The ITC recommendation relates to designated special steels, mainly imported from Japan, the EEC and Sweden, which in total amounted to 163,000 tons worth \$185.3m. in 1974. In 1975 shipments are believed to have risen to 180,000 tons, of which about a third were from Japan.

This compares with Japanese exports to the U.S. of 5.2m. ton (annual rate) of carbon steel in the nine months ended last September, a decline of 8 per cent compared with the corresponding

period of 1974. Steelmakers point out that the drop occurred despite the falling away of Japan's so-called voluntary export restraints in respect of the U.S., at the end of 1974. This is said to show that the industry as a whole is convinced of the need for orderly marketing, if only because it has been highly sensitive to the danger of new calls for protection from steelworkers and others in the U.S.

Special steel exports are less amenable to overall management, either by the industry or the Ministry of International Trade and Industry. That is because the half-dozen large integrated steelmakers which dominate the carbon steel market (and for instance comprise the export-restraining cartel now being set up in respect of shipments to the EEC) are not nearly as significant in special steels.

However, the Japanese attitude appears to be that unilateral foreign restrictions designed to curb the smaller producers would amount to serious over-reaction by the governments concerned. This would particularly be the impression if Washington acts on the recommendation of the ITC at a time when overall steel demand in the U.S. shows signs of picking up.

TOKYO, Jan. 20.

Severe consequences for Sweden

BY WILLIAM DUFFLORCE

THE IMPORT quotas for Swedish special steel exports to the U.S. Global Swedish exports amount to about Kr2.8bn. (\$315m.) a year.

The Swedish steelmakers have commissioned American lawyers to act for them and have given evidence to the ITC. They are meeting here on Friday to discuss future steps but are now looking for action from the Swedish Government.

Basically, the Swedish position is that the ITC recommendation conflicts with GATT principles and is unjustified by the evidence. They reject charges of price-cutting and Government subsidies made last week by a joint American labour-industry group.

The Swedish exporters are 100 per cent privately owned. The only subsidies some of them receive are regional development grants for plants in depressed areas and these are comparable with grants received by U.S. companies. It is claimed.

They ask why the ITC did not prosecute for dumping under the Fair Trade Practices Act, if it price-cutting and Government subsidies were the problem. Publicly the Swedes affirm that the worldwide recession, not foreign competition, is responsible for the troubles of the American special steel industry. Privately, they say the Americans are suffering from their failure to carry out product rationalisation and restructuring effected in recent years by their competitors.

STOCKHOLM, Jan. 20.

EEC asks Commission to intervene

BY MICHAEL VAN OS

THE ASSOCIATION of European Steel Producers, which represents all national organisations in the nine Common Market countries, has asked the European Commission in Brussels to take steps in the U.S. to try and prevent the imposition of U.S. import quotas on foreign special steels.

A spokesman for Estel, the big Dutch-German steel company, who revealed this today, added that the association felt that such a U.S. measure could be a first step towards a protectionist policy for acts of protectionism by the U.S.

Estel, whose chairman is Everi van Veen, president of the European Steel Producers' Association, said that its own company would not be affected by any U.S. import moves on special steels. It is believed, however, that such a quota system could affect U.S. exports of the much smaller Dutch company N.K.F. Staal, a wire manufacturer owned by the August Thyssen, Huette of West Germany.

Robert Mauthner adds from Paris: The French steel industry is seriously disturbed by the recommendation of the U.S. International Trade Commission to subject import of special steel to a system of quotas, but is waiting to see what action the U.S. Administration takes before adopting a formal position.

If accepted, the recommendation could have serious consequences for the French steel industry which last year exported some 47,000 tonnes of special steel to the U.S., nearly one-tenth of its total exports. Exports to the American market rose slightly last year, while those to other countries declined.

Guy Rawlin adds from Frankfurt: The Wirtschaftswissenschaftliche Vereinigung Eisen und Stahlindustrie, the West German Steel Producers' Association, said today that it had no comment to make on the prospects of U.S. import curbs.

A spokesman said that the association was currently in talks with the West German Government, the European Economic Commission and the U.S. International Trade Commission. Until they were completed, comment would be premature.

However, there can be little doubt that the association views the prospect of U.S. import controls with dismay. After more than a year of severely depressed demand, West Germany's steel producers can hardly be expected to welcome moves limiting their export potential now that things appear to be picking up a little.

Initial reaction in the British steel industry is that the U.S. proposals were chiefly aimed at Japanese manufacturers.

AMSTERDAM, Jan. 20.

World Car Markets

S. African sales steady

BY GRAHAM HATTON

JOHANNESBURG, Jan. 20.

SOUTH AFRICAN new car sales continued to inch forward in 1976, showing a rise of 0.99 per cent on the 1974 total, despite a sharp downswing in the economy. Anticipation of rising prices was possibly the chief reason. However, with the introduction of this month of a television service, consumers have a new durable to spend their money on and car sales are likely to take a beating in 1978. With more than half of the market in the hands of five companies—Volkswagen, Ford, Datsun, General Motors and Toyota (in that order)—the rest are going to have to battle for survival.

SOUTH AFRICAN CAR SALES

	1975	% mkt.	1974	%
Volkswagen	35,943	15.49	34,328	+0.32
Ford	31,162	13.61	30,420	+0.20
Datsun	29,543	12.91	26,302	+1.22
General Motors	28,475	12.43	30,828	-1.16
Toyota	16,215	7.08	15,799	+0.17
Peugeot	13,995	6.11	15,348	-0.65
British Leyland	13,188	5.76	13,421	-0.15
Chrysler	12,783	5.30	14,628	-0.48
Mercedes-Benz	10,749	4.69	9,559	+0.68
Mazda	8,990	3.93	8,799	+0.04
Fiat	7,278	3.18	7,509	-0.13
Alfa Romeo	6,807	2.97	3,703	+1.34
B.M.W.	5,210	2.32	2,850	+1.07
Citroen	3,951	1.73	5,302	-0.40
Volvo	2,231	0.97	1,885	+0.18
Hornet	1,728	0.75	1,199	+0.23
Renault	589	0.24	837	-0.10
Lancia and other	73	0.03	85	—
Jeep	1	—	nil	—
Total	229,031		226,776	

* Change in the percentage of the market in 1975 compared with same period 1974.

Swedish equipment for first bagasse pulp mill

BY JOHN WALKER

STOCKHOLM, Jan. 20.

ELOF HANSSON, the Swedish trading company, has received a contract from Peru for the delivery of machinery for the manufacture of newsprint pulp from bagasse, the sugar waste. The new mill will be the first plant in the world to manufacture of newsprint pulp from bagasse, as raw fibre material. The contract is valued at Kr76m. (\$8.5m.) and the plant will have a capacity of about 110,000 tons annually, it is claimed. The paper machine manufacturer, Valmet Oy of Finland, has placed the planning and purchasing work in the hands of U.S. and Mexican consultants. They have also acquired the rights to the State-owned pulp and paper company Induperu of Lima. Induperu have placed the planning and purchasing work in the hands of U.S. and Mexican consultants. They have also acquired the rights to the State-owned pulp and paper company Induperu of Lima. Induperu have placed the planning and purchasing work in the hands of U.S. and Mexican consultants. They have also acquired the rights to the State-owned pulp and paper company Induperu of Lima.

Phillipines sugar plant

FLETCHER AND STEWART Power of Alberta for a 380 MW turbine-generator and auxiliary equipment.

Williams and Glyn's bank—under the guarantee of the Export Credits Guarantee Department—has made available a £10.437m. medium-term loan to Calgary Power towards the GBC contract.

Hosierwell introduced a family of minicomputers it claims will be the most complete product line in that category being offered by a major general-purpose computer manufacturer. Prices for the new Level 6 family range from \$3,854 to about \$50,000.

The Financial Times, published daily except Sundays and public holidays. Subscription rates: £12.00 per annum (including postage) for institutions; £6.00 for individuals. Second class postage paid at New York, N.Y.

China may place \$1.2bn. plants order with Japan

BY COLINA McDUGALL

A CONTRACT worth \$1.2bn. for sales of Japanese industrial plant to China could, in due course, result from the current visit of a Japanese trade group to Peking, according to Japanese Government sources quoted by Agence France Presse in Tokyo.

The deal is reported to include, besides a refinery and petrochemical plant, steel-making, chemical fibre plastic, synthetic rubber and chemical fertiliser plants, large-scale civil engineering, agricultural machinery and steel materials.

The proposal was said to have been made by the Chinese through the Japan-China Association on Economy and Trade. A mission from this Association, led by President, Mr. Yoshi Inayama, chairman of N Steel, is now in China, also discussing the sale of additional 2m. tonnes of steel in exchange for a Jap agreement to import an additional 2m. tonnes of Chinese oil.

To facilitate the plant the Japanese Government said to be expected to an Export-Import Bank fund provide credit of up to 10 per cent of the cost of the plant. Japan are large enough to these funds to meet the cost of these purchases. Interest have not been agreed, however, of 7 per cent expected.

Japan exports decline

TOKYO, Jan. 20.

JAPAN'S exports last year showed their first fall in more than 20 years, according to preliminary figures from the Ministry of International Trade and Industry today.

The Ministry said preliminary exports for 1976 totalled \$59,088m., a decline of 0.2 per cent from the previous year, and the first year-to-year drop since 1953.

Certified statistics for exports, but list those for as well as for prompt sale and are slightly different from the customs clearance figures, and have yet to be announced. The Ministry said exports for 1976 totalled \$59,088m., a decline of 0.2 per cent from the previous year, and the first year-to-year drop since 1953.

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For further information Richard Crumpton, A.R.I.C.S. Estates & Valuation Officer, Newark District Council, Ketham Hall, Ketham, N. Newark. Tel: Newark (0695) 5111.

Newark District Council

Morgan Guaranty Trust Company

OF NEW YORK

Consolidated statement of condition December 31, 1975

Assets	
Cash and due from banks	\$ 3 310 082 470
Interest-bearing deposits at banks	4 155 078 884
U. S. Treasury securities	1 430 640 275
Obligations of U. S. government agencies	127 099 381
Obligations of states and political subdivisions	829 776 163
Other investment securities	390 787 384
Trading account securities, net	405 547 136
Federal funds sold and securities purchased under agreements to resell	352 607 500
Loans, less reserve of \$133 521 500 for possible loan losses	12 865 606 051
Premises and equipment, net	114 301 283
Customers' acceptance liability	706 105 805
Other assets	780 026 491
Total assets	\$25 477 668 823

Liabilities	
Demand deposits	\$ 5 817 640 625
Time deposits	3 618 648 982
Deposits in foreign offices	10 528 326 368
Total deposits	19 964 615 975
Federal funds purchased and securities sold under agreements to repurchase	1 560 559 755
Commercial paper of a subsidiary	83 834 996
Other liabilities for borrowed money	855 666 807
Accrued taxes and expenses	429 827 894
Liability on acceptances	708 332 975
Dividend payable	23 750 000
Convertible debentures of a subsidiary (4 1/4 % due 1987)	50 000 000
Capital notes (6 1/2 % due 1978)	100 000 000
Capital notes (5 % due 1992)	85 000 000
Mortgage payable	15 130 244
Other liabilities	367 751 260
Total liabilities	\$24 244 569 906

Stockholder's equity	
Capital stock, \$25 par value (9,500,000 shares)	\$ 237 500 000
Surplus	427 085 000
Undivided profits	568 513 917
Total stockholder's equity	1 233 098 917
Total liabilities and stockholder's equity	\$25 477 668 823

Assets carried at \$1 622 140 000 in the above statement were pledged as collateral for borrowings, to qualify for fiduciary powers, to secure public monies as required by law, and for other purposes.

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Year to 30th September (£'000)	1975	1974	1973
Turnover (excluding VAT)	26,496	19,815	18,524
Profit before tax	4,213	3,425	3,845
Ordinary dividend per share	4.67p	4.38p	4.23p

- * I am pleased to report a record turnover up 33.7% and Profit before taxation increased by 23%. The total dividend is the maximum allowed under present regulations.
- * The increased turnover of our licensed houses reflects the success of our capital investment programme. Our future financial requirements are well covered by existing borrowing facilities.
- * During the year we entered into a co-partnership arrangement with Harp Lager Limited whose high quality lager we keg and bottle.
- * The trend of beer drinkers to take more head of the distinctive flavour of our beer can only enhance our sales.
- * The compact area in which we trade and the good order of our production units puts us in a strong position to control the effects of inflation. I look to the future with confidence.

E. J. Thompson, Chairman

Courts

INTERIM RESULTS (Unaudited)

	6 mths to 30.9.75	6 mths to 30.9.74	12 mths to 31.3.75
Turnover (excluding V.A.T.)	16,922,000	12,584,000	28,377,000
Operating Profit	2,275,000	1,604,000	3,874,000
Deferred Profit	328,000	(7,000)	389,000
Net Profit before Taxation	1,947,000	1,611,000	3,485,000
Taxation (excluding stock relief)	975,000	790,000	1,829,000
Net Profit after Taxation	972,000	821,000	1,656,000
Interim Dividend (payable 28.5.76)	181,000	162,000	363,000

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- * CURRENCY No interim account of favourable exchange rate fluctuations.
- * DIVIDEND 10% increase, being maximum permitted, despite high cover.
- * RESERVE £6,093,000 of deferred profit to flow into future profits.
- * TRADING Good so far in second, traditionally more profitable, half year.
- * FUTURE Soundly based for continuing further progress.

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OVERSEAS NEWS

Syria controls intervention by the PLA in Lebanon

RICHARD JOHNS, MIDDLE EAST EDITOR

allegation by Mr. Camille al-Jarrah, the Minister of the Interior, that Syria has intervened directly on the Lebanese side in the conflict. It is well calculated to international alarm given Israeli warnings about Lebanon in such an eventuality. The leader of the Syrian Liberal faction did not, it is clear, that the forces of Lebanese troops in the Bekaa valley are wearing insignia of the Palestine Liberation Army would describe them as members of it. 3,500 men of the PLA are reported to have crossed the border on Monday afternoon supporting armed cars. It is 85 mm. guns. It can be seen that they would not have done so without the permission or connivance of the Syrian Government.

The problem has always existed with Salqa, one of the main components of the Palestine Liberation Organisation. The creature of Damascus, undoubtedly Syria has seen it as an instrument by which it can influence the situation in Lebanon. Salqa's leader, Mr. Zuhair Mohsen, also happens to be the head of the PLO's military bureau. Technically, however, it remains under the general command of Mr. Yasser Arafat, the chairman of the PLO, and under the direction of the organisation's affiliate, the Palestine Armed Struggle Command. That, too, goes for the Palestine Liberation Army.

It was founded in 1964 when the late President Nasser of Egypt allowed Ahmed Shukairi, then head of the PLO, to form

military units who were trained by Egyptian officers with the intention of creating a guerrilla force like the Algerian F.L.N. By 1967 it had grown to the strength of three brigades positioned in Egypt, Syria and Iraq. Subsequently, the bulk of the PLA were concentrated in Syria with Nasser having been happy enough to see the greater part of the Egyptian brigade—which had been firmly under Cairo's thumb—transferred to there in 1968.

This left only one battalion in Jordan which did not become involved in the civil war of 1970 and is still stationed there—its commander, Colonel Nuhaud Nusseibeh, who was friendly with King Hussein, was dismissed in the early part of last year. It was, of course, under PLA colours that the invading force of three brigades supported by Soviet T-54 and T-55 tanks crossed from Syria into Jordan in the month of "Black September".

One was the "Hitit" brigade of the PLA which was already stationed in Jordan. The other two were said by Jordanian intelligence to be Syrian Armoured Brigades of the 5th Division. The fact that PLA was—and still is—mainly an infantry force lent weight to King Hussein's contention that this was essentially a Syrian invasion.

Current strength of the PLA is put at 6-10,000 men by Palestinian sources.

CIA 'has undervalued arms aid to Angola'

By David Bell

WASHINGTON, Jan. 20.

THE CIA has consistently undervalued the cost of U.S. arms shipped to Angola by adopting a special accounting system, according to sources within the House Intelligence Committee.

The Committee is expected to publish a report on the agency by the end of the week which will include allegations that the CIA has been deliberately undervaluing the cost of the weapons it has been sending to non-Marxist forces in Angola—apparently in an attempt to keep Congressional critics at bay.

According to the New York Times, the CIA has for instance, been systematically recording the cost of firearms at well below their actual cost to make it look as if the agency has spent less than the \$25m. so far publicly earmarked for Angola.

Meanwhile the State Department vehemently denied today a report in the Washington Post that the CIA knew the identity of the men who assassinated the U.S. Ambassador in Niamea within an hour of his death. But a State Department spokesman acknowledged that the United States was not happy with the way that the Cyprus authorities had investigated the murder.

Soviets and Kissinger may agree

BY MOIRA CUNYNGHAME

MOSCOW, Jan. 20.

THE TALKS between Dr. Henry Kissinger, the U.S. Secretary of State, and Soviet leaders that start in Moscow tomorrow, may produce some agreement on Angola as well as a compromise for a second SALT agreement, according to Soviet sources.

The Soviet Union remains adamant, however, that it will not connect the two issues or agree to Dr. Kissinger's views that Soviet involvement in Angola is threatening détente, and the talks could stumble on this point. On Angola, the Soviet Union appears to have been acting so boldly because it judged, apparently with some justification, that the Americans would not try to match the Soviet involvement for fear of a second Vietnam. It has already reaped considerable success for the number of missiles and bombers each country would be allowed.

The basis for a compromise on the second SALT agreement is said to have been reached. The deadlock arose over the U.S. Cruise missile and Soviet Backfire bomber, which were not included in the Vladivostok agreement putting a ceiling on the number of missiles and bombers each country would be allowed.

The reported compromise puts limits on both these systems, but otherwise leaves the Vladivostok agreement intact.

Both sides have apparently drawn up detailed proposals and an agreement is likely. It is also thought that it may give a new impetus to the Vienna talks on force reductions in Europe.

The Soviet Union, however, is not thought to feel as pressed for time on the SALT agreement as is often supposed. Mr. Brezhnev, with whom Dr. Kissinger will meet unless his talks with the Foreign Minister Mr. Gromyko really fail, does not need to reach an agreement before the party congress next month, although it would obviously enhance his standing.

Dr. Kissinger was met at Moscow's Vnukovo airport by his Soviet opposite number, Foreign

Minister Andrei Gromyko. The Soviet Ambassador to Washington, Mr. Anatoly Dobrynin, was also there. Dr. Kissinger told newsmen: "I've come here for serious talks. I wouldn't come here if I didn't mean it." Hilary Barnes writes from Copenhagen: Dr. Kissinger to-day expressed concern about the effect of the Angola situation on his Moscow negotiations. "Our relations with the Russians are complicated by Angola," he told a Press conference here. Reuter adds from Peking: China today made a bitter attack on Soviet intervention in Angola. An article in the People's Daily, organ of China's Communist Party, described the Russians as imperialist gangsters who planned to plunder all Soviet opposite number, Foreign

Military options facing Israel

A SPECIAL CORRESPONDENT

LAST thing the Israeli leadership wants at the moment is war in the Middle East. Even the prospect of picking up Southern Lebanon up to the River, while strategic, does not begin to make up for the disadvantage that would result from a pending Syrian move into rest of disintegrating on. For a direct Syrian-Israeli clash, the almost inevitable sequence of such incursions in Lebanon—it is totally unwise due to the new burden of war and material losses it would carry the risk of expanding to a wider Arab-Israeli

Israel's anxiety to avoid as shown itself in the careworn nature of its war-torn possible Syrian intervention in Lebanon. Israel's forces must, nevertheless, have contingency plans for the Israeli have their own. They can be deduced with amount of certainty from what is not said in public. Private by Israeli soldiers' military commentators. The allow for the possibility of general war, or for a campaign on the Syrian front, or the Egyptian front. Interestingly, Israeli planning directly counter to foreign nations about the lessons of 1973 war.

Mobility

Foreign experts have tended to opinion that the large deployment of precision weapons, seen for the time in the last Middle East war, has greatly diminished the value of tanks and attack aircraft in the blitzkrieg attack. In the weapons, anti-tank and aircraft missiles, and radar automatic cannon, they can inflict such heavy on tanks and aircraft in the old, bold way much more conservative in their employment are necessary. But that means very least a general slowing of the pace of warfare, perhaps an end to the whole idea of rapid, break and exploitation leading to a decisive victory. These are the ideas that have undermined the Israeli of war. Israel, with its mobility the entire work cannot afford long wars of attrition. Whether through wishful thinking or superior analysis, soldiers have concluded they can still fight a blitz war.

It is accepted that the effective of aircraft over the battlefield as permanently decreased, are replacing aircraft in of their attack roles by to-ground missiles and an emphasis on artillery, in many reconnaissance by the use of small, remotely piloted vehicles. For the rest, they are on improved electronic measures and the use of "smart bombs" to hang out of danger. The even bigger problem has

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Uganda talks 'progress'

the Smith Government in African National Council "a little more progress"

made at yesterday's two-session of talks in Salisbury. Tony Hawkins writes. A statement after the meeting the plenary session had particularly with "the elementary structure," adding he two sides are to meet tomorrow. Yesterday's session was the fifth full-scale talks started on 6, taking the total spent in formal talks to than eight hours. Ian Smith said afterwards he thought the discussions last "quite a long time."

Uganda to pay

India and Uganda will sign an agreement in Kampala this week offering compensation to more than 8,000 Indians expelled from Uganda in 1972, according to New Delhi officials quoted by Reuter. No figure for the total amount of compensation was disclosed.

Premier quits

Mr. Tom Lewis, the Premier of New South Wales, resigned his posts as Premier and leader of the Liberal Party after his party passed a vote of no confidence in him, Reuter reports.

Reserve ratio cut

The Bank of Japan decided to make a second reduction in the reserve ratio of commercial banks—the percentages of deposits deposited interest free with the Bank of Japan, Charles Smith writes from Tokyo.

The reduction, varying in amount according to types of deposit and the size of bank, will release an estimated ¥400bn. worth of funds into the economy.

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HOME NEWS

Plessey announces 'major' investment programme

By Christopher Lorenz, Electronics Correspondent

Plessey Telecommunications yesterday went some way to outlining its plans for the transition from electro-mechanical products to electronics by announcing a "major"—though unspecified—investment programme which will start this year.

Included in the programme is the establishment at an existing factory in Chorley, Lancashire, of assembly and testing of the new TXE4 semi-electronic exchanges for the Post Office. Plessey at present has only one TXE4 plant, at Huyton on Merseyside.

The announcement also said that the Pioneer Works at Wigan, employing almost 500 people on electro-mechanical products, would have to be closed by the middle of this year.

The closure forms part of the 2,000 jobs cut which Plessey announced in September after drastic cuts in Post Office orders.

Plessey said that it was accelerating the manufacture of "electronic technologies" in order to take advantage of export opportunities.

The Pentax and transmission activities at Beeston, Nottingham, would be "enhanced" and new work on the assembly and testing of Pentax would be introduced at Fleming Road, Speke, Merseyside.

In the North-east, the assembly of transmission products would be introduced at the Sunderland plant, which has traditionally made electro-mechanical exchange relays.

Plans for the central plant at Edge Lane, Liverpool, were not detailed.

A "major modernisation and rebuilding programme will be introduced to enable the plant to take in the production of advanced electronic products," the company said. But it would not say whether this included TXE4.

Like all the Post Office's telecommunications suppliers, Plessey is facing a difficult period of labour relations, with short-term cuts in Post Office orders exacerbating the long-term rundown in employment as it gradually converts to the design and manufacture of electronic products.

These products are far less labour intensive than electro-mechanical designs, especially in the high-volume telephone exchange sector.

Plessey told the unions before Christmas that there would be no more redundancies in the medium term—which is taken to mean until at least the summer—provided that there was no change in circumstances.

However, it will be considered an extraordinary feat if this applies throughout the next two years.

Our Wigan Correspondent reports: After a meeting with Plessey management at the Wigan plant, the joint shop stewards committee pledged to fight "tooth and nail" to stop the closure.

Mr. Derek Keen, the works convenor, said that management had still not explained why they had "picked on" the Pioneer Works. "We have evidence that the factory is a profit-making concern."

Mr. Alan Fitch, MP for Wigan, has said he is ready to act immediately to try to avert the closure.

Glasgow cuts must stay, says Ross

By Chris Baur, Scottish Correspondent

LEADERS of Glasgow Corporation failed yesterday in their efforts to persuade the Government to treat the city as a "special case" which should be exempted from many of the public spending cuts being ordered by the Scottish Office.

A delegation led by Mr. Peter McCann, the Lord Provost, which travelled to London with the backing of local MPs and trade union leaders, was told bluntly by Mr. William Ross, Secretary of State for Scotland, that there was no possibility of Glasgow's escaping the "very severe limitations on public spending" which, he said, it was of the utmost importance for all local authorities to impose.

Mr. McCann said: "We got nothing except a lot of sympathy."

The council's Policy and Resources Committee has offered to make spending cuts of £8.5m for 1976-77. This compares with the £13.4m saving suggested by the Government's guidelines, a saving which the council says would be impossible to accomplish without throwing about 3,000 of its 16,000 employees out of work.

Rate support

Glasgow's own scheme of economies is designed to avoid redundancies. Its finance officers calculate that if the balance had to be found without Government assistance it would mean raising rates by some 13 per cent.

The corporation's proposal has been turned down by Mr. Ross, who urged the deputation to "think again" about its planned expenditure and bring this into line with Government proposals.

The Minister made it clear that there was no question of revising the system for distributing rate support grant in the current year; nor was it possible to increase the level of grant except as a result of pay, price and remuneration increases within the Government's code.

Scottish Conservative MPs last night agreed unanimously to urge the Scottish Secretary to appoint a committee of inquiry into Glasgow's affairs.

New BP tanker will be laid up with two others in Brunei

By John Wyles, Shipping Correspondent

BP's new tanker building programme was completed yesterday on a gloomy note with the delivery of the 266,000-deadweight-ton British Ranger, which is destined for immediate lay-up because of the world tanker surplus.

Of the seven Very Large Crude Carriers BP Tanker had on order at a cost of about \$250m: 12 months ago, only two are at sea, while the Ranger will join two other new vessels, the British Reliance and the British Resource in mothballs in Brunei.

After delicate negotiations, BP has reached agreement with Mitsubishi Heavy Industries to substitute four cargo liners for 700 20-foot boxes.

The other two VLCCs on order. The cargo liners are the first of a new class of multi-purpose ships to be built by Mitsubishi and after their delivery next year they will be leased by BP to Ocean Transport and Trading, the Liverpool-based shipping company.

This appears to be a timely arrangement for Ocean, which is gradually modernising the 25 liner fleet it employs in its West African trades. The new vessels from Mitsubishi will be capable of carrying break bulk, packaged and containerised cargo as well as grain or ore. Full container loading will accommodate 700 20-foot boxes.

Wide range of rises in water charges

By Donald Macdonald

WATER RATEPAYERS in England and Wales face varying increases in charges as a result of the decision last month that charges had been too low for people whose property connected to a sewerage.

Repayments totalling £60m are due to those sewerage connections, according to the National Council—means an increase in general charges to connected properties of 1976-77 of 21 per cent.

The Thames Water Authority has prepared its 1976-77 figures on the basis of a 10 per cent increase on the previous year plus about 2 per cent for administration costs. North West Water Authority incorporated an increase of 14 per cent. Wessex Water, which serves the South West, has a 10 per cent increase. Severn Trent 31 per cent.

Proposals to 80 per cent for Northumbrian Authority would include a 17.3 per cent rise.

Test case

The need for refunds without sewerage charges arose after such charges challenged by Mr. Philmond, a Devon household test case, decided in his favour by the Lords on December 16.

Legislation to clarify the position of general services water authorities in 1974, and to clear the confusion by local authorities as to whether they were collecting a sewerage charge.

About 900,000 refunds are expected to be claimed by water authorities by the end of the year. The Welsh Water Authority agreed on a 10 per cent increase in its (cost) charges in 1974, but a 30 per cent increase resulting in a 10 per cent increase in the bill for services is up 17.4 per cent.

The death of a supertanker —by its two survivors

FINANCIAL TIMES REPORTER

THE NORWEGIAN supertanker Berge Isstra sank within a minute of three explosions blasting the structure of the 224,000-ton vessel, according to the two Spanish survivors.

In a radio account from the Japanese fishing vessel which the Imeldo Barreto Leon reported that three other colleagues from the 32-man crew were also thrown into the water by the force of the explosions.

The search for further survivors continued yesterday but without success.

One aircraft reported sighting an empty lifeboat near where the two Spaniards were rescued but the markings on the dark yellow craft could not be distinguished.

Speaking through an interpreter ashore, Leon said he was painting on the tanker's deck with four other men at about 4.45 p.m. on December 30 when an explosion ripped through the stern section.

As the men scrambled for lifeboats, a second explosion came within 15 seconds, and a third after 30 seconds.

The men were thrown into the water and the Berge Isstra vanished below the surface within a minute. Leon said he managed to reach a lifeboat floating nearby, and pulled in the

second survivor, 39-year-old Estisanto Terradomo Lopez.

The two, both from Tenerife in the Canary Islands, drifted for 19 days, living off fish and rainwater. Both were in good condition when they were finally spotted.

The Japanese fishing vessel which rescued them was heading last night for the Palau group of islands east of the Philippines, where the survivors were to be transferred to an American Air Force jet and flown to Okinawa.

U.S. officials said they would wait until they could question the two before deciding whether to resume the search.

BAA preparing air traffic forecast

By Michael Donne, Aerospace Correspondent

THE BRITISH AIRPORTS Authority is to undertake a year-long study and forecast of future international air traffic for the Western European Airports Association, which includes 17 of the major airports in Europe.

The aim will be to prepare forecasts for each of the airports involved, to help in planning new developments up to the end of this century. Parts of the study will be sub-contracted to Coopers and Lybrand Associates, management consultants, and the Frankfurt Airport Authority.

The forecasts will be regularly updated, so that all the airports will have a co-ordinated view of what is happening in European air traffic.

"This should make the task of preparing new terminal buildings, runways and other ground facilities easier,"

Outcry—but no TUC showdown yet with Government

By Roy Rogers, Labour Correspondent

OPPOSITION to the rising unemployment levels grew yesterday among union leaders. But in spite of a considerable outcry it was clear that the TUC was not seeking a showdown yet with the Government.

TUC leaders, however, may voice their growing concern to Ministers at Monday's monthly meeting of the Labour Party TUC Liaison Committee.

Then, and at further talks planned between the TUC and Mr. Denis Healey, the Chancellor, union leaders are likely to repeat demands for a target date to be set by Government for reducing the jobless figure to 600,000.

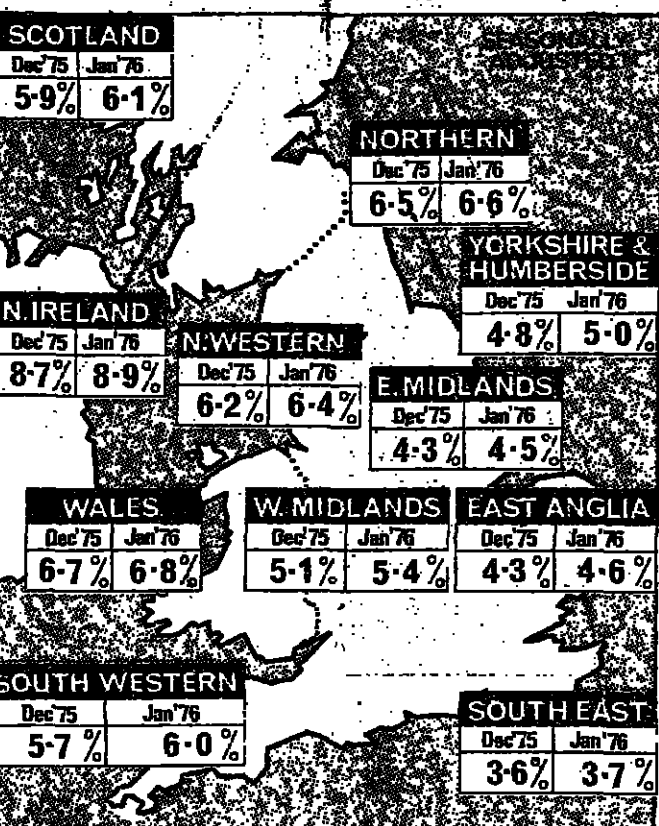
Mr. Len Murray, TUC general secretary, said that yesterday's unemployment figures were "disastrous". The TUC was pressing the Government to take action—and take it soon.

Mr. David Bassett, general secretary of the General and Municipal Workers' Union, was more explicit in demanding that the Government steps to subsidise jobs including extending the temporary employment subsidy, promoting investment demand by assisting companies to build up stocks, putting more money at the disposal of the

Birds Eye advises

BIRDS EYE Foods has opened a telephone advisory service on home freezing at Walton-on-Thames 24071. Birds Eye has also published a booklet, Freezer Facts for Freezer Families, available for an 11p stamp from Mr. Pat McIlkenny, 100 The Old Pines, Epsom, Surrey.

Unemployment by regions



Public sector deficit shows little change

By Anthony Harris

A PUBLIC sector financial deficit of £2,078m for the third quarter, under £2.3bn, or 71 per cent shown in the new sector financial accounts published by the Central Statistical Office, is considerably lower than other figures about public sector spending have suggested, and shows remarkably little growth through the year.

This suggests that public borrowing has been swollen by late and deferred tax and rate payments and by lending to the private sector more than had been supposed, and that spending on goods, services and social payments has risen less than was thought.

Product of beer hits peak

By Kenneth Gooding, Jr. Correspondent

BEER PRODUCTION almost certainly topped 32.5 million barrels prior to the previous year, a record since the statistic first collected in their form in 1929.

Publication yesterday of Customs and Excise November beer output only a slight decline on last year, 1976. As a result, production in the January-November period was bulk barrels (at 288 pint barrel), 2.47 per cent up 11-month total in 1976.

It would have taken a 12 December beer sales record the brewers of exports duction record.

Indications from the suggest that Christmas was not particularly successful. But there are no points massive drop in business.

Sir Alan Walker, chairman of the annual meeting of Charrington, biggest of beer producers with an export of the total reported that sales of beer extremely good and well expectations.

In November, beer output 3.366m barrels, a slip of cent, on November, 1976 was the best performance brewers in that month since

SNOW REPORT

	Depth (cm)	State of W.
GERMANY		
Berchtesgaden	30-110	Good
Garmisch	30-110	Good
Mittenwald	50-70	Good
SWITZERLAND		
Brasov	50-80	Good
Grindelwald	40-120	Good
Leysin	15-40	Good
Widnau	30-50	Good
The following report has been by representatives of the Ski Great Britain:		
	Depth (cm)	State of W.
Anders	40-50	Good
Plims	30-70	Good
Isola	80-120	Fair
Leysin	20-100	Good
Murten	40-120	Good
Nend	20-100	Good
St. Anton	40-120	Good
Times	20-70	Fair
Scot	10-30	Good

£2m. offered for studies

By David Finkel, Science Editor

A FURTHER SUM of £2m. to grants to support applied research projects of commercial interest by academic researchers is to be made available by the Wolfson Foundation this year.

In a letter to Vice-Chancellors and principals, Major-General A. R. Leakey, director and secretary of the foundation, invites applications for support from teams which contain individuals acquainted and interested in industry, and which are strongly led.

Applications are to be assessed by a panel of experts under the chairmanship of Lord Zuckerman, formerly the Government's chief scientific adviser, and a trustee of the foundation.

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HOME NEWS

Iceland Premier's visit
raises little optimism

MALCOLM RUTHERFORD IN LONDON AND JON MAGNUSSON IN REYKJAVIK

THEIR HALLGRIMSSON, the Icelandic Prime Minister, has invited to visit Britain for about the end of the year, possibly week-end, but there is no optimism on either side as to an early settlement.

Mr. Hallgrimsson, visiting the British Isles, is part of a wider task force as a result of the fisheries dispute, which here was still "a long way before we can reach agreement with Britain."

The three Royal Navy frigates, which sailed out of the island last night, leaving 14 British trawlers they protected for the past two weeks, it became clear the U.K. Government has received no assurance that Icelandic fishermen would return.

Mr. Hallgrimsson, Minister of the Foreign Office, is expected to be in the House of Commons only if he hoped and expected this to be the case. If the

Still far apart

Mr. Callaghan was specifically thanked for his initiative at a special meeting of the NATO Council called at Britain's request, yesterday morning. The meeting also thanked the Icelandic Government.

Even if the harassment is over, however, it is clear that the two

sides are still far apart and that there is considerable opposition in Iceland to any settlement at all.

Mr. Hallgrimsson and other Icelandic Ministers have repeatedly said recently that the original offer of a British catch of 65,000 tonnes a year is no longer on the table and there have been some indications that they will now propose a figure very much lower.

Britain has said it might now be prepared to go below 100,000 tonnes, but nothing like as far as 65,000.

The Icelandic Opposition is arguing that Mr. Hallgrimsson should not "go begging to Britain," but should rather invite Mr. Wilson to Reykjavik.

Two other factors will make it difficult for the Icelandic Government to make an acceptable offer to Britain, even if it wants to. One is that Iceland's winter fishing season is just beginning and the Icelanders want as large a share of the catch as possible for themselves. The other is that the UN Conference on the Law of the Sea, which could agree to 200-mile limits as the norm, is due to resume in New York in March.

There is still no agreement between British and Icelandic scientists on the extent of the measures needed to conserve fish stocks.

Parliament, Page 12

BP, National join
petrol price war

BY RAY DAFFER, ENERGY CORRESPONDENT

BRITISH PETROLEUM and all part of the Shell-Mex and BP marketing organisation.

If the cut-price war intensifies, as expected, it is likely that Shell, with its 7,500 sites, would be forced to join in with selective discounts. Each of the companies are striving to retain market shares at a time when sales are falling.

Shell, with a fifth of the market, said yesterday that it was making no move for the time being.

Petrol retailers fear the effects of intensified competition, but it could have a beneficial effect on the Retail Price Index at a time when the Government is striving to tame the rate of inflation.

The decision by BP National and Esso means that prices in some regions could be cut to about 70p per gallon for four-star, compared with a notional price of 77.5p.

As with Esso, BP and National are offering discounts of up to 2.8p a gallon provided this amount is matched by retailers. When VAT is taken into account, the cut works out at about 7p a gallon.

Both BP and National said discounts would be introduced on Friday in the Midlands, the North of England and Scotland, where competition is most intense, and last for three months.

This is the first time that BP and National have acted separately from Shell as, until the end of last year, they were

Overbooking
plan limited
in scope

By Michael Donne, Aerospace Correspondent

ALTHOUGH VICTIMS of overbooking by U.K. airlines will receive mandatory compensation under a scheme planned by the Civil Aviation Authority, there is no way of enforcing such a system on foreign airlines operating to and from this country.

The Government will be urging those foreign airlines to adopt voluntarily similar measures to those applicable to British airlines.

Lord Winterbottom, the Government's spokesman on trade matters in the Lords, told the House that the CAA's scheme was being discussed with the airlines.

When introduced, it would probably take the form of an amendment to the airlines' operating certificates issued by the CAA, providing for such compensation when overbooking occurred and resulting in passengers being off-loaded.

Lord Shepherd, Leader of the House, suggested that the issue could be raised again later, when all the issues involved could be aired with full explanations.

The CAA's decision to introduce a mandatory scheme of compensation for passengers overbooked and subsequently off-loaded from specific flights followed a ruling by the Lords that such activities were illegal under the Trade Descriptions Act.

CBI urged to back
broad principles
of prices scheme

BY ELINOR GOODMAN, CONSUMER AFFAIRS CORRESPONDENT

THE NEGOTIATING team of the Confederation of British Industry will recommend to its Council to-day that it accept the broad principles of the voluntary price restraint scheme finally agreed on yesterday with Mrs. Shirley Williams, Prices Secretary.

The scheme, which keeps to the general outline of proposals announced in summer to accompany wage restraint, will limit

More Home News
on Page 35

manufacturers' price rises on some items to under 5 per cent. for six months from February 1, but will not come into effect in the shops until February 14.

The Retail Consortium, which until now has found it more difficult to agree to the scheme than the CBI, will have a similar meeting with its members to-day. Both employer organisations are expected to announce their agreement this afternoon, and Mrs. Williams probably will give a progress report to the Commons this week.

Final details of products included in the package, however, may not be officially released until next month.

This is partly because some points still have to be settled — particularly among the numerous trade associations which have to give undertakings on behalf of members — and partly because the Government wants the scheme to have maximum publicity when it is launched in the shops.

The retailers are understood to have made some headway in persuading the Minister that they must retain the flexibility to alter prices of listed items.

But the basic idea of restraining price rises on selected items to a maximum of 5 per cent. is thought to have been retained.

Definitions of the 50 or so products to be covered, ranging from food to fuel, have, however, been tightened so as not to be so wide.

New unit trust sales
at lowest for years

CHRISTOPHER HILL

NEW investment in unit trusts in December touched a low for the year at £11.2m., down from £14.9m. in November. This reflected the fall in the total value of unit sales of approximately £5m., but the value of new sales also dropped by £1.4m.

Unit trust managers take the view that this is a normal fall in sales, and do not see that it is unusual for the time. They point to the repurchase figure, and that the main influence for the month was the working month in November.

said that sales in the new-year period were down on those for the other months of December, and this was the general expectation. Christmas is usually a time ending rather than saving, and even this December was better than the previous year when net new investment only £7.7m.

value of funds increased £2.47bn. to £2.51bn. in November, although the number of trust accounts fell from 2.19m. to 2.18m. in December.

Newspaper
campaign
wins award

THE LONG campaign by the Sunday Times to go ahead with serialising Richard Crossman's Diaries yesterday won the prize for Campaign of the Year from the "Grange" TV programme.

The newspaper was praised for its "guts, daring, editorial judgment and a great deal of plain cheek to outwit efforts from those on high to get parts of the diary suppressed."

Irish Press photographer Mr. Cyril Byrne, junior, won the Scoop of the Year award for his enterprise during the Monasterevin siege in the Irish Republic, at the end of last year.

Mr. Colin Welch, who started the Peter Simple column in the Daily Telegraph and is now the newspaper's deputy editor and chief leader writer, was named Journalist of the Year for "a brilliant year's work in a career of brilliance."

Mr. John Edwards, of the Daily Mail, won the Reporter of the Year award for articles of "great zest" from the most unlikely spots.

The Columnist of the Year award went to Jon Akass of the Sun.

IE CONTRACTS

Marconi wins £8m.
defence orders

MICHAEL DONNE

Marconi has awarded Henry Boot the contract for 296 dwellings and 77 garages, worth about £2,750,000. The company will also undertake the modernisation of the 44-64 St. Vincent Street, Glasgow, on behalf of Commercial Union Properties (U.K.), Leeds, for about £700,000.

DOWTY GROUP has received orders worth more than £4m. for equipment for Hawker Siddeley Sea Harrier vertical take-off and landing strike aircraft recently ordered by the Royal Navy. The contracts cover the supply of landing gear, hydraulic and fuel flow proportioners by Dowty Rotol and fuel control systems made by Dowty Fuel Systems for the aircraft's Rolls-Royce Pegasus vectored thrust engine. In addition, Dowty Electric manufacture a range of electrical switches and indicators for the Sea Harrier's cockpit. Dowty Seals will provide a variety of sealing products, and Innesworth Metals will supply a range of precision castings for the aircraft.

CLARKE CHAPMAN, Gateshead, has won an order worth more than £1.75m. for cladding the CEB's Littlebrook D power station under construction at Dersford, Kent. Clarke's Horsley Pigott division will supply, fix and install cladding, roofing, patent glazing, ventilators, louvers and internal insulation for the boiler and turbine houses, electrical annex and other buildings. Work, scheduled to begin in March, is expected to take two years, and is being carried out as a sub-contract for Cleveland Bridge and Engineering Co., main structural contractors. Clarke's power plant division will supply the boiler for the station's three 650 MW (e) generating units.

BOOT CONSTRUCTION, d. has been awarded three contracts worth more than £7m. for work at Nottingham City Council and valued at £3,800,000, for the erection of 322 residential flats and 31 integral garages and 31 integral garages and 31 integral garages. The scheme will be fed from a central heating station's three 650 MW (e) generating units.

ON FRIDAY, THERE WAS
A DEBATE IN THE
HOUSE OF COMMONS ON
SMOKING AND HEALTH.THE MINISTER OF STATE
(HEALTH) ASKED FOR
A STEADY REDUCTION IN
CIGARETTES OF:-

1. TARYIELD

2. CARBON MONOXIDE

3. NICOTINE

THE SILK CUT RANGE
IS ALREADY:-

*1. LOW IN TAR (as defined by H.M. Government)

*2. LOW IN CARBON MONOXIDE

*3. LOW IN NICOTINE (as defined by H.M. Government)

*Silk Cut has done all this through its special ventilated filter system, combined with specially selected tobaccos.

SILK
CUT

The mild cigarette.

LOW TAR As defined by H.M. Government
EVERY PACKET CARRIES A GOVERNMENT HEALTH WARNING

For every product, there's an ideal container. One of our jobs is discovering it.

The right container can get your product to the retailer economically and safely, and move it off his shelves quickly. The wrong one can land you with any number of problems. So an important part of Metal Box's job is to advise manufacturers on all forms of packaging in metal, plastic, paper or board from initial specification to pack design.

We can take a new product from formulation stage to production line; advising on the best and most economical existing container or devising a completely new one.

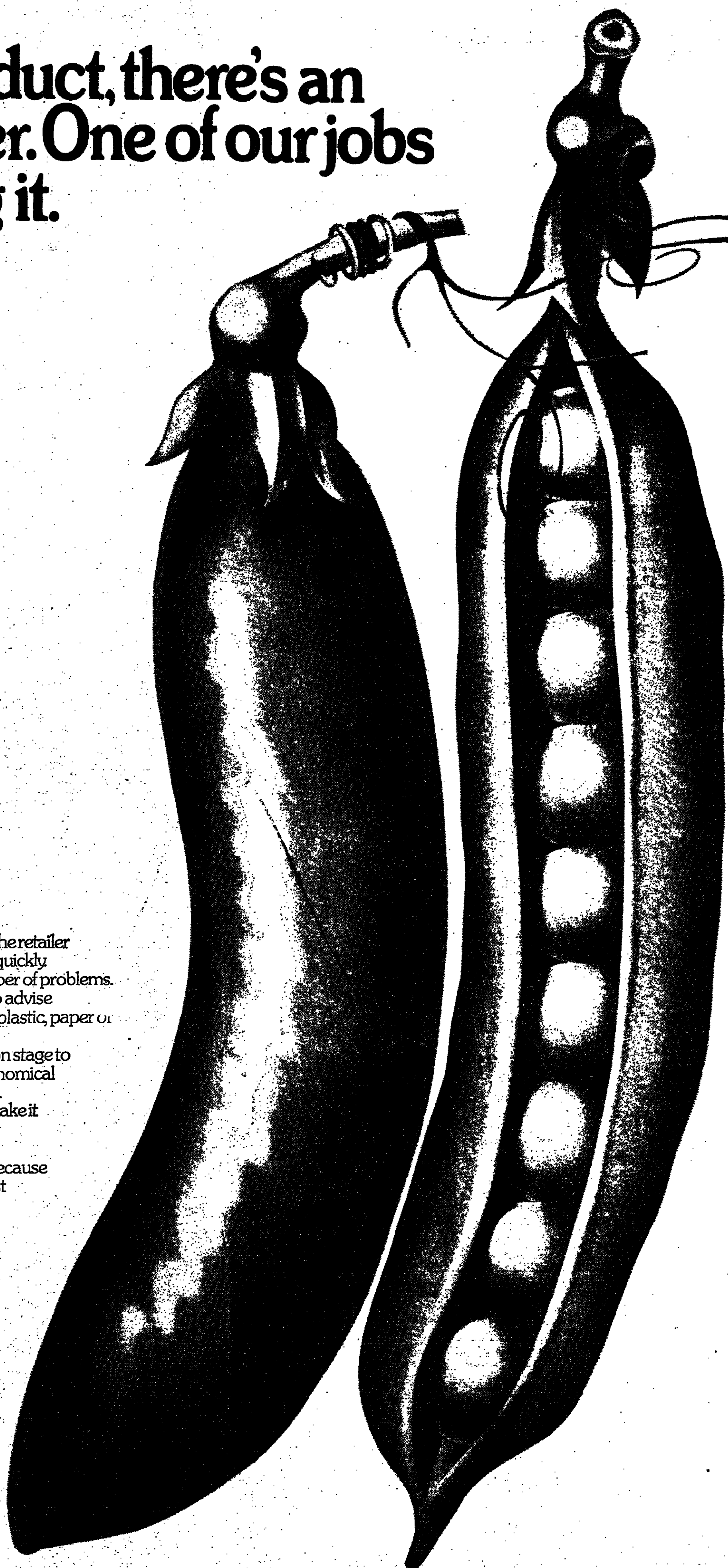
We can create and install the machinery to make it and the line to fill it; as well as providing complete technical and management back-up services.

And even when that's done, our job isn't—because we'll be able, thanks to ongoing research, to suggest modifications and improvements as techniques develop.

It's all part of the Metal Box service. And it's all part of the professionalism that has made us Europe's largest manufacturer of containers and doubled our world sales (third of which come from overseas) to 455 million in the past five years.



Metal Box Limited





MP loses Bill to ban corporal punishment

THE COMMONS yesterday rejected by 61 votes (181-120) a private members' Bill to abolish corporal punishment in schools.

Moving the Bill under the 10-minute rule, Mr. Dennis Canavan (Lan. Stirlingshire W.), a teacher, said that corporal punishment had a brutalising effect on the pupil-teacher relationship rather than one of mutual respect. It could lead to sadism by the teacher and masochism by the pupil.

But, according to Mr. Patrick Cormack (C. Staffordshire S.W.), the Bill was "judicious, specific, do-gooding nonsense. To hoots and jeers from Labour MPs, he claimed there was something in the old adage 'that if you spare the rod you spoil the child'."

Mr. Canavan had described corporal punishment as "one of the last vestiges of a legalised form of violence in our society today."

He said that many young teachers coming into the profession had pacifist ideals and they were likely to be branded as soft-hearted if they did not approve of corporal punishment. "Such punishment was ineffective. It might lead to a temporary suspension of bad behaviour but it could become counter-productive. Is it any wonder that there is child battering and other forms of violence in our society?" he added, to Conservative shouts of derision.

Mr. Cormack said that discipline was an essential part of teaching, and he regretted that Mr. Canavan should try to withdraw from the teaching profession a sanction "without which many of them could not carry out their job."

The teacher had to instil civilised values and a sense of order often into extremely rebellious children. He claimed that one reason for the "appalling high level" of illiteracy was lack of discipline. Mr. Cormack added that the Bill's proposals could only do destructive damage to the educational system and future countless millions of children.

Closed shop agreements

By John Hunt

THERE ARE now at least five public sector industries where union closed shop agreements for new entrants have either been agreed or firmly proposed. Mr. Michael Foot, Employment Secretary, told the Commons yesterday.

The industries concerned were mining, electricity, British Rail, British Gas, and the Post Office, he told Mr. Ian Gow (C. Eastbourne).

Mr. Gow suggested that it was a serious affront to individual freedom to make it a precondition of employment that a person should belong to a union. In reply, Mr. Foot said he appreciated that the establishment of the closed shop did raise questions of the rights of the individual as well as the trade union concerned. But he said the Government had discussed with the trade union movement the best way in which the system could be operated.

We believe the best and most effective way is to establish the tribunal which the TUC has proposed," he added. "The sooner we get that into operation the better it will be."

Seat belt proposals

WHEN THE Government seeks to introduce compulsory seat belts, children will not be allowed to ride in the front seat of cars unless they have a harness, Dr. John Gilbert, Transport Minister, said in a Commons written reply yesterday.

He said: "If Parliament grants power to make seat belt wearing compulsory, I shall seek to ensure that children ride in the back seats of cars unless protected by a harness."

Jobless tide of anger swirls around Wilson

BY PHILIP RAWSTORNE

THE GOVERNMENT was engulfed yesterday in a violent wave of anger that swept from the Labour backbenches in the wake of the unemployment figures. It overwhelmed the hapless Mr. Michael Foot who scarcely got his head above water again for 45 minutes. It broke so severely over Mr. Harold Wilson that even his natural buoyancy barely kept him afloat.

And, carrying the sympathy of Mr. Selwyn Lloyd, the Speaker, it threatened finally to drag Mr. Denis Healey, the Chancellor, into the Commons for a full-scale debate.

"The Labour movement is not going to stand for it much longer," Mr. Foot was sternly warned—and the warning was quickly passed to the Prime Minister as he took his seat.

With Mr. Foot by then totally swamped, Mr. Wilson advanced like some latter-day Canute to check the flood. "The whole House will regard these figures as extremely grave and serious," he declared.

"MPs will recognise," he added hopefully, "that this is happening in every advanced industrial country in the world."

But Mr. Norman Ashton, the Left-wing MP for Tottenham, retorted that all that was clear was that the Socialist case for redaction was going by default. "There is a feeling of deep sadness... a great deal of disillusionment certainly on this side," he said bitterly.

And former Industry Minister, Mr. Eric Heffer, demanded that the PM should stop hiding behind the collapsing capitalist system. "That is no answer for a Socialist Government," he said. Genuine Socialist

measures were needed—controls on imports and capital movements and a general reduction to provide more jobs.

Mr. Wilson shared their concern but not their conclusions. Grasping at the straws of economic statistics, he reassured the Government's priorities of lowering inflation and raising exports and investment.

But it was the Conservatives who, rushing to ensure that he was thoroughly doused in the Labour protests, provided him instead with a lifeline. "The Labour Party is now becoming the natural party of unemployment," Mrs. Margaret Thatcher taunted, diverting Labour's fury in her direction.

"These figures are due to the failure of your Government to handle the nation's economic affairs properly and, in particular, to tackle the problem of inflation early enough," she declared.

Amid uproar, Mr. Wilson replied: "I totally reject that." Inflation and recession had been world wide, he said—and if he had followed Conservative advice in dealing with them, there would be even more jobless now.

To jeering from the Labour benches, Mrs. Thatcher rejoined: "There are no alibis now. You are the head of the Government which has the highest unemployment figures since the war. If you are not responsible will you please sack whoever is."

"I did, in the election of March, 1974, with the help of a few million votes," snapped Mr. Wilson, clambering gratefully, if temporarily, out of trouble.

Mr. Michael Foot, Employment Secretary, suffered the worst mauling of his Ministerial career yesterday when, for almost an hour, MPs of all parties angrily berated him over the latest unemployment figures showing that the number of jobless is approaching 1.5m.

Unfortunately, Mr. Foot had little comfort to offer the House. Indeed, he forecast that there may be a further rise in the rate of unemployment over the next few months. After that, he expected an improvement in world trade to be reflected in higher demand for labour.

In the medium term, he anticipated that inflationary measures would be introduced to improve the economy and one of the factors to be considered in this was import controls. Currently, he pinned his faith on the job creation programme to alleviate the worst hardships.

In noisy exchanges, the Conservatives called for his resignation and claimed that the Government was now reaping the whirlwind for having "let inflation rip" in order to win the last general election.

The Scottish Nationalists saw the rise in figures as further evidence of the price that Scotland was having to pay for centralised government from Westminster. The Liberals complained that the continual expressions of regret which came from Mr. Foot month after month were no substitute for a policy.

But the most bitter attack of all came from Mr. Foot's own left-wingers who demanded a new programme of immediate reflation and the introduction of import controls to solve the problem.

A succession of Labour backbenchers rose to attack the Government for its failure to take immediate measures. When Mr. Foot spat out to them the steps which the Government had already taken, they growled discontentedly that these were "only Tory measures."

Leading the onslaught, Mr. Eric Heffer (Lab. Walsley) warned: "If we are not talking about it being deplorable, it is deplorable. We now need some positive action on the part of this Government to bring unemployment down, otherwise the Labour movement in this country will not stand for it much longer."

There was an ominous intervention by Mr. Jim Sillars (Lab. South Ayrshire), one of the founders of the breakaway Scottish Labour Party, who claimed that the Cabinet was using unemployment as a means of managing the capitalist economy.

"How can we honour the Labour party manifesto pledge to shift the balance of power and wealth in favour of the working people when we are heading for 1.5m. unemployed?" he demanded.

To Labour cheers, Mr. Martin Plummer (Lab. Hillsborough) advised him: "The answer is to begin refuting the economy and negotiating properly organised import controls."

Further protests about the Scottish unemployment situation came from Mr. Norman Buchanan (Lab. Renfrew W.) who declared: "Enough is enough. These figures are totally unacceptable to Scotland as they are to the north of England. Has the time not come for an entire change in the Government's policy?"

A call for wide-ranging and effective import controls came from Mr. Max Madden (Lab. Glasgow, W.).

Defending his record, Mr. Foot repudiated allegations that the Government was using unemployment as an instrument for controlling the economy. He told the House: "We wish to see effective measures taken to reduce unemployment and the measures the Government has taken are designed to do that."

Long and medium-term policies would be greatly assisted by the establishment of the National Enterprise Board while short-term measures announced in September and just before Christmas would have an immediate effect.

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Minister sets out Giro targets

By Justin Long, Parliamentary Correspondent

PLANS TO enable the Post Office Giro to provide overdraft facilities and compete with the clearing banks was given a mixed reception in the Commons last night, when the Government announced new financial targets for the proposed expanded service to Giro customers.

"The financial objective is that over the three years 1975-76 to 1977-78, Giro will earn—after paying interest on its remaining loan capital—an average annual return of 12½ per cent on its published dividend capital plus retained profits," Mr. Gregor Mackenzie, Minister of State, Industry, told MPs.

This aim would call for a successively better performance from Giro during each of the three years in question, the Minister maintained when he rejected Tory criticisms of the Post Office (Banking Services) Bill incorporating the new proposals.

"They would make it possible for the Post Office to be in a position to offer a full range of banking services," said Mr. Mackenzie.

He assured critics of the Bill that competition with the banks would be fair. It was the intention that the new Giro credit operations would be self-supporting and that Giro did not anticipate seeking further capital from the Government to finance those operations.

Nor would Giro be subsidised by the rest of the Post Office. It would continue to pay on a commercial basis for its use of Post Office services. It would also continue to publish separate accounts so that its performance could be properly maintained and assessed.

Mr. Michael Noble (Lab. Rosendale) claimed that the present situation was a result of the failure of capitalism and suggested that a little bit of socialism was needed.

Treasury Ministers: "It is no good saying we want to refit as soon as we can. If import controls were introduced it could be done now," he argued.

There were Labour cries of "Hypocrite" when Mr. James Prior, "shadow" Employment Secretary, told Mr. Foot: "No one can any longer have confidence in the words you utter from that Dispatch box."

Shouting to make himself heard above the noise from the Labour benches, another Tory spokesman, Mr. Barney Hayhoe, said that unemployment had more than doubled since Mr. Foot had taken office.

"You have a worse record than any other Minister responsible since Miss Margaret Bondfield in the 1929-31 Government," he said.

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LABOUR NEWS

Non-docker unions seek jobs scheme changes

BY JOHN HUNT AND CHRISTIAN TYLER

TRADE UNIONS unions, to prevent their members from extending the dock labour scheme, but it will be open to Mr. Foot to promise now that such legislation will be written into the TUC to-day to try to agree a committee stage.

They are anxious to present a united front—including the dockers' section of the Transport and General Workers' Union—before the Second Reading of the Bill, which Mr. Michael Foot, Employment Secretary, told the Commons yesterday would come very soon.

Mr. Foot made it plain yesterday that he had no intention of dropping the Bill, which will allow a reconstituted National Dock Labour Board to stipulate that certain work within five miles of docks or waterways should be carried out by registered dockers only.

The Second Reading is expected within the next few weeks—and possibly before the end of next week. A Bill cannot be

changed before its Second Reading, but it will be open to Mr. Foot to promise now that such legislation will be written into the TUC to-day to try to agree a committee stage.

Whether jointly or individually, the non-docker unions will demand certain exclusions as the price of recommending their sponsored MPs vote for it. The MPs will be in touch with their unions for briefing before the Second Reading of the Bill, which Mr. Michael Foot, Employment Secretary, told the Commons yesterday would come very soon.

There will be moves at the TUC meeting to press the Minister to exclude some port jobs such as crane-driving and some inland work in warehouses and cold stores from the new definition of "dockwork."

In addition, unions may want a bigger say in deciding where and how the dock labour scheme is to be extended. As it stands, the Bill gives the power of

SACTIONS planned by about 4,500 Ford Motor craftsmen in support of demands for better representation on the company's negotiating machinery threatened to delay the launch of two new cars later this year.

The unofficial Ford National Skilled Committee, which claims the support of 4,500 of the company's 7,000 craftsmen, has called for a policy of non-operation from February 1 unless its representation demands are met.

The sanctions, the latest move in a long battle for the restoration of craftsmen's traditional pay differentials, will centre on refusal to move between plants, adherence to safety regulations and a ban on additional overtime being worked to repair emergency breakdowns.

Hopes of averting the threatened sanctions rest on a meeting of this week of the Ford national joint negotiating committee.

So far, however, the NJNC has been unwilling to give way to the skilled men's demands for a greater say on the joint works councils and national governing committee which are dominated by the Transport and General Workers' Union.

This dominance, especially on the conversion of other Ford factories to be consulted before any major items are agreed by the

platers and pipefitters, employed by more than 20 contractors, who decided to strike in protest against the 3.30 p.m. ruling.

Shop stewards claim that, in the past, several contractors had allowed meetings during working hours, provided permission had been given and the men met without pay.

The dispute has been referred to regional officials of the unions involved.

More than 2,000 men are employed at the site. About 1,000 engineering workers are continuing to work normally.

There were areas in L. of industrial decline. equalled anything to be for Merseyside or in other depressed areas, he said. The had decided to clamp down further agreements to re workers and jobs to New.

While 20,000 jobs were able in London for skilled, ers, he said the unions did not match the skills req Demand was greatest in engineering trades, but Training Services Agency had end this "mis-ma-

son (AEU executive member), Mr. Les Gregory (Electrical and Plumbing Union), Mr. A. general secretary of the Shires (Transport and General Workers' Union), and Mr. J. Morrell (General and Municipal Workers' Union).

On the aerospace side, nominations are Mr. Arthur Hearnsey (AEU executive), Mr. Les Buck (Sheet Metalworkers' general secretary), Mr. R. Boardman (TGWU), Mr. Jack Ashford (GFTU), and Mr. George Doughty (former general secretary of the technical and supervisory section of the AEUW).

If an AEUW executive member is appointed, he will have to resign. Mr. Hearnsey is due to retire this year and Mr. Edmondson late next year.

Nominations for the shipbuilding industry organisation committee include Mr. Len Edmondson (late next year).

Mr. King said the way the Bill was worded actually enabled the Post Office to extend into the banking services and not just the "bank resources" as defined in the Bank of England rules. He understood that no commercial bank would be allowed under the rules to be set up on that basis. It was an extremely serious allegation.

"I understand, on that basis, Giro is unable to protect its depositors on its own resources, and would need recourse to the Government, involving a further write-off of losses."

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Truist Bank refuses 12% rise

By Our Labour Staff

A 12 PER CENT pay, on behalf of 12,000 bank lodged since the 55 pay was introduced in July last, was rejected by the TUC Savings Bank.

The claim by the National Union of Bank Employees based on the cost of living between March and August last year and comes at a principal settlement for staff last year.

Now that NUBE has rejected the TUC and is supporting Government's pay policy claim puts the union in anomalous position.

The 12½ per cent rise for would give some a higher-paid staff, such as givers, more than £6, 1, give all the staff more the rise within 12 months.

Arbitration

NUBE, which wants matter taken to arbitration, may try to have the pay claim accepted.

Labour leaders are to be paid once pay policy is agreed. The union is to meet TSB early next month; there is no offer, arbit may be agreed.

TSB salaries range around £2,600 a year for cashiers to £4,400 for managers and nearly for managers of the 1 branches.

UNEMPLOYMENT in London twice that of Wales and that of Scotland, Sir Re Goodwin, Leader of the G London Council, said yesterday when he launched a campaign to encourage workers to improve their skills through the Training Services Agency.

There were areas in L. of industrial decline. equalled anything to be for Merseyside or in other depressed areas, he said. The had decided to clamp down further agreements to re workers and jobs to New.

While 20,000 jobs were able in London for skilled, ers, he said the unions did not match the skills req Demand was greatest in engineering trades, but Training Services Agency had end this "mis-ma-

son (AEU executive member), Mr. Les Gregory (Electrical and Plumbing Union), Mr. A. general secretary of the Shires (Transport and General Workers' Union), and Mr. J. Morrell (General and Municipal Workers' Union).

On the aerospace side, nominations are Mr. Arthur Hearnsey (AEU executive), Mr. Les Buck (Sheet Metalworkers' general secretary), Mr. R. Boardman (TGWU), Mr. Jack Ashford (GFTU), and Mr. George Doughty (former general secretary of the technical and supervisory section of the AEUW).

If an AEUW executive member is appointed, he will have to resign. Mr. Hearnsey is due to retire this year and Mr. Edmondson late next year.

Nominations for the shipbuilding industry organisation committee include Mr. Len Edmondson (late next year).

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The Executive's World

David Fishlock, FT Science Editor, sees a Wolfson Foundation move bringing

Glad tidings for research

A TIME when universities are enduring a specially hard time from constraints on public funding, news that another £2m to be made available this year for research will gladden hearts of many academics.

Wolfson Foundation has written to all vice-chancellors and principals in the country to put forward D-ideas for support. The primary constraint is that research shall be "targeted", that is, at an ultimate economic payoff. This was the basis on which, in late 1969, Lord Zuckerman, chairman of the Wolfson Foundation, and his fellow trustees to put up £4m to start a total of 60 research projects. It developed into a commitment to spend \$6m over the next five years.

It's pump priming—but we show that it works, says Lord Zuckerman, formerly the Government's chief scientific adviser. It began as a concern that far too much U.K. university research was never transferred to industry or commerce. Too many even treated their cash from industrial patrons as "tainted money" and heaved projects that might be a useful outcome.

Appraisal

But an appraisal by Lord Zuckerman of the achievements of a project he has directed since 1968 has convinced the trustees that it is working more successfully than they could have hoped. At the end of the appraisal, he told them they would be lucky if one in 20 of the research projects they backed had a substantial and early economic return. In fact, they have done much better. Eight of the first 40 produced either industrial products or contracts for further research at industry's expense. The most important thing to note out of his appraisal, says Lord Zuckerman, is that many are being encouraged to use their research to develop the prosperity of the country. "And the shorter the delay, the better for them—the university and for the nation."

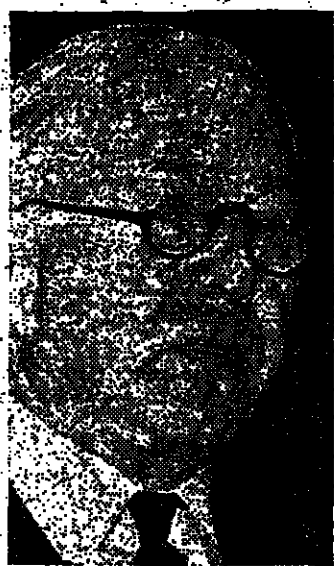
The way in which ideas are supported have this much in common: the foundation aims to locate the places where a small amount of cash might make a big difference to the project. At the outset the trustees decided that they would favour universities which had the social efforts to establish close relationships with local industry.

How successful they have been might be judged from the number whose responsibility it is to seek out new ideas is

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Lord Zuckerman



Mr. Leonard Wolfson

company might develop, who wrote to the Wolfson Foundation saying: "Wherever I have met a Wolfson unit the route into the university has been much simpler and more direct."

The accompanying table summarises the Wolfson projects reckoned to have yielded an economic return. Judged most successful was the modest £20,000 a year invested in the five advisory units at the University of Southampton over the seven years 1968-75. The outcome has been a royalty income for these "Wolfson services for industry" now running at £276,000 a year. The biggest grant went to the University of Nottingham, where the metallurgists set up the Wolfson Institute for Interfacial Technology. The grant included the cost of a new building. With the help of Professor John Morley, formerly a Rolls-Royce researcher, the unit has carried out a part of the work of the failure of carbon fibre in the RB-211 project. This has led not only to a deeper understanding of failure mechanisms in the new composite materials but to patented "duplex" materials, capable of absorbing immense amounts of energy without failing.

Anguish

At Edinburgh, the Wolfson Micro-electronics Liaison Unit endured the anguish of seeing its chosen collaborator—the nascent Scottish electronics industry—suffer a bad time from overseas competition. But under a new director it fought its way back to become an established centre for contract research in solid-state electronics, as the profile shows.

Lord Zuckerman's appraisal produced other evidence of success than economic pay-off. In several cases closer links between university and industry had spawned other collaborative ventures on the campus. There were cases where research had been taken up in other departments of the university. Some projects had stimulated interest from government-granting bodies, so that the researchers found themselves involved in bigger projects.

The appraisal concluded that "success is built on success"—that the successful projects were

usually, those in universities where close liaison with industry already existed, or where a department's reputation for basic research was held in high regard by industry. Projects succeeded where there were strong directors and where units enjoyed continuity of staff. Least successful were those where the director had resigned or retired, where the teams had changed frequently, planning was poor or the associated industry itself was in trouble.

Thus the Wolfson Foundation has established a firm base of experience spread across 32 universities and like institutions from which to scrutinise new proposals this time. It is planning a seminar in London next month when directors of the successful units will say

how they did it, and directors of those that experienced trouble will be asked to say why. By then it should have the first applications for the new round of grants, for which special consideration is to be given once more to proposals "aimed at the rapid development of commercial projects through the transfer of existing technology to the many small industrial firms."

Professor Farvis believes that if there is going to be a big advance in industrial practice in Britain, it will be wrought by men trained in university research departments. His own department boasts equipment for the manufacture and study of micro-electronic devices which might well cost a company £500,000 to install from scratch. In addition to which it has access to one of Scotland's best-equipped computing centres, only a few steps away.

The grant of £150,000 from the Wolfson Foundation five years ago gave the department the chance to offer consultancy and practical assistance to local companies. With the money it built and equipped new laboratories adjoining those of the department, creating the Wolfson Micro-electronics Liaison Unit, aimed at solving what they imagined to be industry's problems. At the outset, Professor Farvis admits, their ideas were "a little hazy" but the foundation did not press them to be too precise.

However, it was businesslike enough to make it clear to the dons that this was to be a one-

WOLFSON UNIT PROJECTS WHICH HAVE LED TO A REAL ECONOMIC RETURN

University/Department	Subject	Funding £	Return or potential return to Foundation
City: Chemistry	Electrochemical technology	36,050	Patent rights taken out
Edinburgh: Chemistry	High-speed liquid chromatography for analysis	92,500	—
Edinburgh: Electrical Engineering	Micro-electronics liaison unit (computer-aided design, etc.)	130,700	Patent rights being taken out
Essex: Electronics centre	Electronics	33,000	—
Leeds: Colour Chemistry	Organic Powders Research Unit (printing, etc.)	84,278	—
Leeds: Mining Engineering	Tunnel excavation	76,800	—
Nottingham: Metallurgy	Interfacial phenomena (new materials)	255,000	Patent rights taken out
Southampton: Faculty of Engineering and Applied Science	a. Industrial noise and vibration control unit b. Electronics Industrial Liaison Unit c. Engineering Materials Advisory Service d. Marine craft advisory unit e. Applied Electrostatics Advisory Unit	30,000 24,400 50,000 16,500 24,800	Two token repayments

ment of commercial projects through the transfer of existing technology to the many small industrial firms." They are wondering whether anyone will have the gall—or the ideas—to suggest, as one U.S. institution did at the outset, that it should simply be given all the available cash.

HOW IT WORKED FOR THE DONS OF EDINBURGH

And-for all injection of cash in the companies' laboratories. As Professor Farvis sees it, however, it is an educational experiment and not a rescue operation. It was up to the unit to seed the flow of funds from other sources, preferably industrial sources, and so become self-supporting.

Window

To-day the department regards its Wolfson unit as its "window to the world." In effect it is a contract research centre. Under Dr. David Milne, director since 1972, it undertakes what to a university are short-term research projects, lasting up to two years. This bridges the gap between its industrial clients and the work of the department itself (which is looking anything upwards of three years ahead). The unit anticipates an income from research and design contracts exceeding £100,000 for the year ending in March.

From the outset the dons recognised that, as "amateurs with virtually a business to run," they needed some expert guidance. So they recruited an advisory Board, under Professor Farvis, which included a number of prominent Scottish industrialists in electronics, such as Dr. Melvyn Larkin, managing director of Microelectronics, and Peter Kirby, research director of Welwyn Electric (who also became a visiting professor).

But the Wolfson "window" also enables companies to get to know the local students. Students now spend time working

NOT SO LONG ago the accent was all on growth and size. "The bigger the better," was the slogan. "If you are not growing, you're dying," was the accepted wisdom. To-day it has swung the other way. "Small is beautiful," we are told. Zero-growth is good for you.

Now, right on cue, comes the "Stay-small strategy," which has been commended to me on a dozen occasions in the past 18 months in places as far apart as Auckland, Bergen, London and Singapore. One of its most ardent supporters is the head of the New Zealand operations for one of Britain's largest companies.

The core of the "Stay-small strategy" is simple. As a small company grows, its problems multiply and it becomes progressively more difficult to run. Eventually a point is reached—300 employees—where the company reaches a critical mass and the severity of its problems then begin to increase explosively.

Most people recognise that some such threshold exists: most people would agree that crossing it calls for great care and skill from the proprietors: most people know that some of them come completely unstuck when trying to make the transition—but until recently hardly anyone would seriously suggest to a proprietor that he should not even try.

Stay-small strategists do say this—that the problems that have always been severe at this threshold have been made so much more severe by recent events that crossing it is no longer worth the risk. In fact, they go further: not only should one not try to cross it, one should deliberately do everything possible to avoid even approaching it.

Critical mass

There are three clear signs that a company is approaching its critical mass. One is when the proprietor or founder has to employ someone to do almost everything he used to do himself. He probably used to do the selling, the invoicing, the typing—everything from sweeping the floor to raising a loan at the bank. When he finds that he spends nearly all day telling other people what to do instead of doing it himself, the Rubicon is not far away. At the same time he finds he has to adopt formal management systems—he can no longer see the customers' lorries leaving his factory, for example, and only knows that seven did so yesterday because a daily report on his desk tells him so.

But the most critical warning signal comes when he no longer knows how many children each of his employees has. When he does not know everyone's name, the threshold may already have been passed—and if any of them do not know who he is, then it certainly has. And this brings us straight to the central pillar of the stay-small argument: if you allow your company to grow so large that your

BY JOHN ARGENTI

Small is beautiful

employees do not know who you are they may cease to trust you. If that happens the company is wide open to infection from militants and gone forever is a small company's most priceless asset.

But come now, it will be said, this has always been so; that one might lose touch with one's employees has always been a possible risk in going through the size barrier. That is true, but what has changed is the severity of this problem: not so long ago the worst that a disaffected labour force would do to a company was to go on strike for a few days. Now it will bring the company to its knees.

Nor is it only in human relations that old difficulties have emerged in new more virulent forms. Governments now interfere in business far more than they did and some of them find it fashionable to do so malevolently. Fortunately some companies can escape monopolies commissions, nationalisation, supervisory boards, closed shops, equal pay, planning agreements and price restraints. Who are these lucky companies? Small ones.

And when large companies are tied in knots by their own bureaucracies the small ones can still keep up with all those unforeseen and unforeseeable changes that now so characterise our world today.

Of course, no one pretends that small companies will now have it all their own way, merely that the balance of advantage has begun to swing back in their favour for the first time for several decades. And all this ignores that extra incentive not to expand found in Britain above all other nations, namely taxation.

But, it will be objected, if one's company is to stay small it has to stop growing and that means its profits will stop rising. There are two tricks that have to be learnt, it seems, before one can make success of the stay-small strategy. The first concerns single firms, the second relates to holding companies.

The trick of making profits grow while the physical size of the company remains static can

John Argenti is a consultant in corporate strategy.

John Argenti is a consultant in corporate strategy.

SOTHEBY'S ISLAMIC WEEK

APRIL 12th to 15th 1976



A Gurgan pottery ewer, 13th century A.D., 9 1/2 inches high, sold on 14th July, 1975 for £1,100

To coincide with the World of Islam Festival in London, Sotheby's will hold a special series of sales of Persian and other Islamic Antiquities, Miniatures, Lacquer, Carpets, Manuscripts and Paintings and Photographs of Middle Eastern interest

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How to weather it.



No2.

Rubery Owen (Holdings) Co Ltd had a problem.

Downtime in the Cold Press Department by press operators waiting for machines to be reset or changed over to other components had swollen to as much as 100 hours per week. And that meant a lot of money wasted.

How did they weather it?

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If there is any area in your business operation that you feel could benefit from a training scheme, contact the Industrial Training Board for your industry. Either direct or through the TSA.

TRAINING SERVICES AGENCY

An executive arm of the Manpower Services Commission. One study prepared from information supplied by Rubery Owen (Holdings) Co Ltd and the Engineering Industry Training Board.

BUSINESS PROBLEMS

Capital gains tax and new shares

Last year I accepted 50 shares in lieu of dividend, on 1,000 shares cost £500. For capital gains purposes is the cost of the new shares to be taken as (a) nil, (b) £10 in lieu of the dividend, (c) £10.40 representing the dividend plus tax credit?

On the assumption that you are referring to companies resident in the U.K., the answer is (a). The 1,000 shares would be treated as having cost £500. The bonus shares will be treated like an ordinary bonus issue and the existence of the cash option will be ignored.

Under the new rules in the Finance (No. 2) Act 1975, the 1,000 shares would have been treated as having cost £510, broadly speaking. The detailed rule is set out in paragraph 5 of schedule 8.

Copyright in music

I have a piece of music marked copyright which was composed by Greg with words by Sir Walter Scott. Surely it cannot be copyright. Could you tell me how copyright in music works?

The copyright may exist in respect of the words, the music or the arrangement (or two or all of them). It does not follow that a claim to copyrights can be substantiated, and the distance you have could turn out not to be protected by copyright. The duration of the English copyright is 50 years from the author's death, or first publication (if later).

Car park for employees

As solicitors we have as a client a company which provides a car park for its employees. During the night shift there have been a series of break-ins into private vehicles on the car park, result-

ing in damage to vehicles and loss of contents. Is the company liable to its employees if so, that a full consideration would be required? It requires a conference with counsel might best serve your purpose.

Your query raises complicated issues in the law of bailment in respect of which much will turn on the terms of employment of the employees, the terms on which the car park is made available for the employees, any exemption clauses or notices, and

No legal responsibility can be accepted by the Financial Times for the answers given in these columns. All inquiries will be answered by post as soon as possible.

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WEDNESDAY, JANUARY 21, 1976

Observer

FINANCIAL TIMES SURVEY

Wednesday January 21 1976

Concorde

Much praised and much abused throughout its thirteen year development, Concorde still faces its greatest challenge as it goes into service today. Only by proving its social and economic acceptability on the world's major routes will it generate sales.

14 DAYS ENTRY into service Concorde had landed at 83 airports in 49 countries, and in all on fare-paying passenger flights to Bahrain and with Air France via Dakar, marks a major turning point in the aircraft's long and turbulent story. It marks the end of a long period of gestation, from design through research, development and production to certification. During this time Concorde has demonstrated a remarkable capacity for survival against almost perpetual rears of cancellation and constant criticism over its, and, latterly, social acceptability also. From to-day, Concorde can set out to prove at its designers' and manufacturers' claims that it would usher in a revolution in the story of transport are facts, not expensive dreams.

Exhaustive

It could be argued that, so far as the latter is concerned, has done that already. During the flight test programme—the most exhaustive ever conducted by any civil airliner anywhere in the world—the eight Concorde participating in the programme, two pre-production aircraft, and four production aeroplanes had collectively flown 5,542 hours by the certification date of December 1975—more than three times as much as the Boeing 747 when it received its Certificate of Airworthiness. Of those hours, more than 1,000 had been at supersonic speeds. The number of flights is 2,478, of which 1,514 were person missions, while an

It is a record that is a tribute to the British and French manufacturers. In the course of that flying, which has continued since then both for purposes of crew training, route proving, charter operations and demonstration flights, some 10,000 people, many of them among the most influential in their own spheres, had been shown just what the difference was between supersonic aviation and conventional subsonic travel. Virtually all of them admitted that the difference was dramatic, and that given the choice, they would "go supersonic" whenever possible.

It has always been argued by Concorde's protagonists that, throughout history, whenever mankind has invented a faster way of getting from one place to another, it has generated its own market. This, it has been argued, was what Concorde was always intended to do, the reason d'être of the entire programme. Now, the testing time has come, and Concorde is out on its own in one of the toughest market places of all—the great international long-haul air routes of the globe. The world's major airlines, their governments, the rival aircraft manufacturers, and the travelling public will all be looking to Concorde to prove itself—not least among them the manufacturers of Britain and France who built it, and the two governments and the taxpayers who have financed it. It would be satisfying if such an occasion to be able to

suggest that this venture was centred. It is a fact that while embarking upon its career in some of their criticisms have been found to have been unfair surrounding it. But, for a variety of reasons, Concorde has a harder task to perform than any other new aeroplane before it.

Proving itself economically will be tough enough, especially in the light of the high price involved in it—£25m. a time, other parts of the world. It is

that being legal action—the environment has mounted in intensity in recent months as the flight endurance trials were conducted out of Heathrow, giving French Governments taking diplomatic action if it does not. Either way, there is likely to be a period of considerable abrasion and difficulty, before the matter is settled one way or another.

It seems likely, therefore, that

Boon to mankind or a noisy nuisance?

By MICHAEL DONNE, Aerospace Correspondent

Acceptability

This question of social acceptability is discussed in greater detail in this survey, but it is vital because it could well affect Concorde's economic future, and with it the whole future of supersonic air travel.

Probably the most severe test of the Concorde's social

further public hearing in Washington earlier this month. Now, the Department of Transportation is sifting all the environmental, political and economic factors involved, and has promised a decision on whether or not Concorde will be allowed to go to the U.S. by February 4 at the latest.

But even if this decision is favourable, it does not seem likely that U.S. services will begin for a long time to come. It is considered certain that which ever side loses in this

The social criticism, which

Evaporated

The "options" placed by many of the long-haul airlines during the development phase have evaporated under these twin pressures of environmental objections and rising costs, so that to-day the order book is thin, with only five aircraft firmly contracted for by British Airways and four by Air France, with options or letters of intent for three each from Iran Air and the Civil Aviation Administration of China.

Neither of the latter are committed to buy, and so they must be classed as being among those long-haul operators who are "sitting on the fence," waiting to see how Concorde performs in passenger service before deciding whether or not to commit themselves.

It seems more likely that, for the first year or so of Concorde service, some of these long-haul airlines will prefer to negotiate leasing arrangements with British Airways and Air France on their Concorde services, guaranteeing to fill a percentage

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of seats on each flight. This arrangement would enable some of them to get the benefit of being able to offer "Concorde service" to their own customers without the burden of buying the aeroplane. It is possible that the governments of those airlines may require this kind of collaboration as part of the price they will exact for permitting Concorde to use either their airspace or their airports, even on a subsonic basis.

In this situation, it is appropriate to suggest that the

CONTINUED ON NEXT PAGE

Fly the future—fly the flag.

The introduction of Concorde has involved a great deal of planning by British Airways which has ordered five Concorde, with the second due for delivery in the spring.

British Airways' plans

THE BRITISH Airways flights to Bahrain that start to-day, at the same time as Air France begins its flights to Rio de Janeiro, represent a new pinnacle of achievement in air travel. Not only will the passengers be flying faster than any fare-paying passengers have ever travelled before—at more than twice the speed of sound, or Mach 2.1 as it is called—they will also be enjoying a standard of comfort and inflight cabin service that has rarely been matched.

BA itself is starting services with two flights a week to Bahrain, Mondays and Wednesdays with two flights back to London, on Tuesdays and Thursdays, all non-stop. The flights will leave Heathrow at 18.00 and arrive at Bahrain at 18.00 local time. They will leave Bahrain at 10.00 local, arriving at Heathrow at 11.20 local time. The journey time for the 3,515 miles will be just over 4 hours, travelling subsonically across Europe to the area of Trieste, then going supersonic down the Adriatic to the Mediterranean itself, past Crete, Rhodes and Cyprus to the coast of the Middle East, and then partly supersonic and partly subsonic across Lebanon, Syria and Jordan, Saudi Arabia and on to Bahrain in the Gulf.

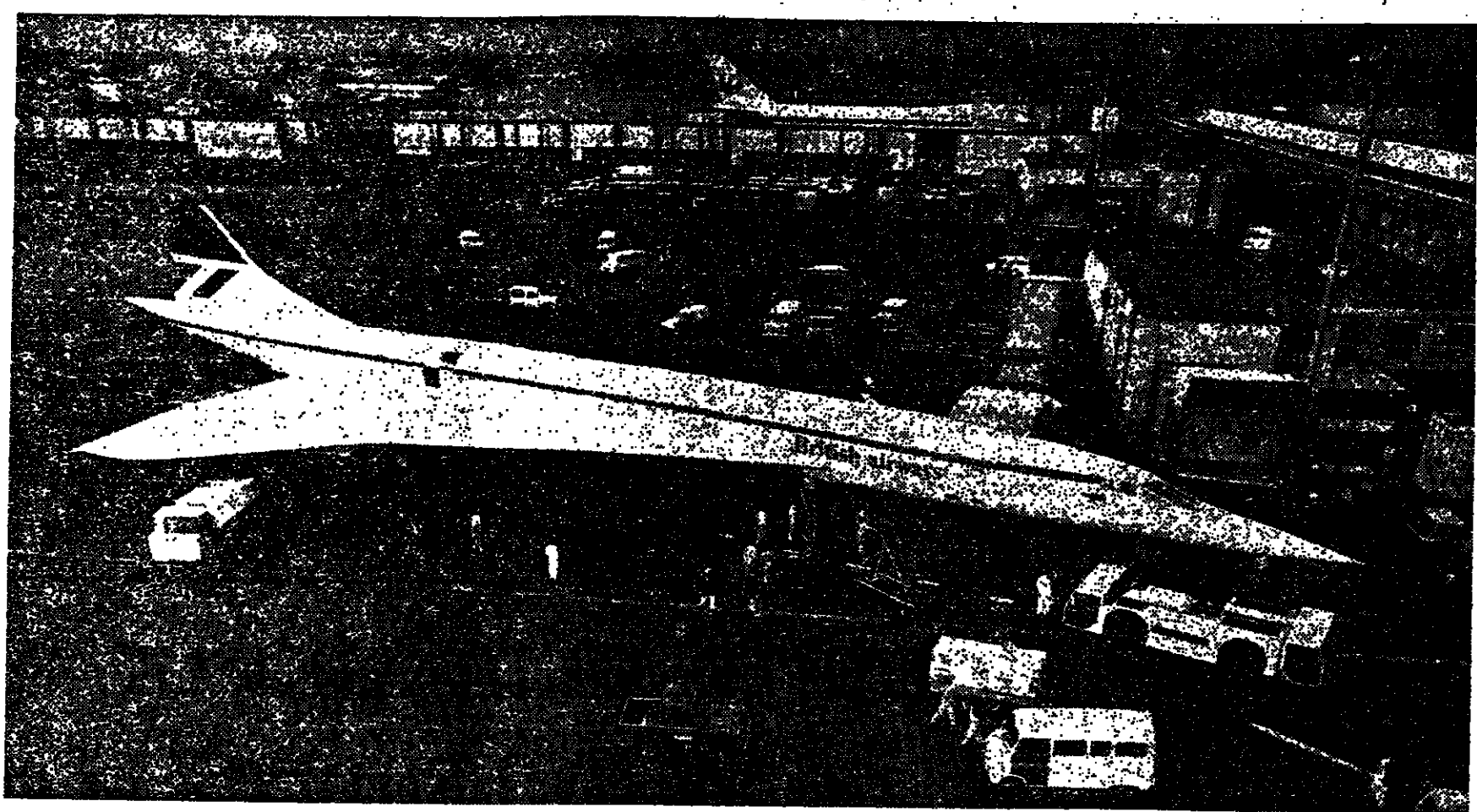
So far, BA has taken delivery of one of the five Concorde it has ordered, with another due for delivery this spring. Its order is worth £150m, reckoning in all the spares and other associated equipment—including a new Concorde flight simulator—of which it has already paid some £40m-£50m, to the manufacturers in progress payments. It has been training up to five full crews initially, with more still

being trained, including 14 pilots and seven flight engineers. Preparations for Concorde within British Airways have been the responsibility of 53-year-old Mr. Gordon Davidson since October, 1974. Mr. Davidson, formerly a navigator with BOAC, was deputy commercial director of the BA Overseas Division before taking up the Concorde post. He has set himself five major objectives, which he described as "the Concorde Bill of Rights."

Permissions

The first objective has been to obtain the right traffic rights to the right places, getting the permissions required to land and pick up passengers. In addition to the Bahrain route, BA, with the assistance of the U.K. Government, has been negotiating for landing rights beyond the journey time for the 3,515 miles will be just over 4 hours, travelling subsonically across Europe to the area of Trieste, then going supersonic down the Adriatic to the Mediterranean itself, past Crete, Rhodes and Cyprus to the coast of the Middle East, and then partly supersonic and partly subsonic across Lebanon, Syria and Jordan, Saudi Arabia and on to Bahrain in the Gulf.

All of these ambitions, of course have still largely to be fulfilled but the airline remains confident that sooner or later it will be able to get the permissions it needs. In the meantime, most of the immediate interest is centred on the transatlantic route between Heathrow and Washington and New York, where the U.S. Government has yet to announce its decisions in



A British Airways Concorde on the ground at Heathrow.

the light of the review conducted by the Department of Transportation following the public hearing into Concorde in Washington on January 5. The outcome of this review is promised by the U.S. DoT not later than February 4. Every one on this side of the Atlantic is hoping that it will be favourable, but even if it is, it is not likely to mean an early start to transatlantic flights. It is recognised, for example, that

any favourable decision for Concorde by the U.S. Government would be immediately challenged by the various environmental lobbies, which are very strong, and especially those representing communities

immediately surrounding Dulles or even subsonically into the Airport at Washington and Kennedy Airport, New York. The ensuing court cases could drag on for many months, so that it will probably not be until much later in the year before the whole matter is cleared, and Concorde flights could proceed.

Equally, it is recognised that if the U.S. decision by Feb. 4 is anti-Concorde, some kind of diplomatic action will be inevitable by the U.K. and French Governments, in a bid to protect their rights under their bilateral air agreements with the U.S. In such a case, too, there would be bound to be a long drawn out diplomatic wrangle, lasting several months.

Either way, therefore—as Mr. Davidson has already suggested realistically—any Concorde flights do not seem likely much before the end of 1977. This felt, enough businessmen will place added emphasis on the acquisition of rights in the other parts of the world already mentioned, and it is certain that diplomatic activity in those directions will be stepped up in the coming months.

Timetables

Mr. Davidson's second objective has been to provide the right timetables, so that the time the business executive saves by using Concorde is time he can usefully use. This means, for example, making it possible eventually to visit the U.S. and return to the U.K. within a day, if he wishes to do so. Timetables for the U.S. run, of course, must await the decision on whether or not services can start at all, but in the meantime some provisional planning, in return services a day with Concorde to New York, and perhaps one return service a day to Washington.

The aim will be also to try to avoid leaving a Concorde on the ground unnecessarily for many several hours—or even overnight—so that it may well be that through the medium of the interline agreements, BA will be able to take Concorde on to other places, such as Bermuda, the Bahamas, Miami

ing standards, a second-class or even subsonically into the U.S. to such destinations as Houston, before returning to the Eastern seaboard cities for the supersonic flight back to London. The point is that everything about the transatlantic situation is flexible at this time, in the melting pot until firm planning can be undertaken in the light of a full U.S. Government decision. The third point on Mr. Davidson's Bill of Rights, was the objective of negotiating the IATA, and ultimately between governments, the right fares which will attract the optimum market for Concorde.

So far, the IATA fares talks have resulted in an agreement to charge first-class fare plus 20 per cent for the initial flights to Bahrain and Rio de Janeiro. At that level, it is still felt, enough businessmen will be attracted to Concorde to provide adequate load factors, while it is not yet too low as to damage the continued first-class traffic in subsonic Jumbo and other jets. Whether the surcharge remains at 20 per cent, or comes down as Concorde services expand, remains to be seen. Many people who have studied the Concorde for years believe that once its gets into service, it will quickly establish itself and start taking traffic away from the subsonic services.

In that case, either the other airlines could protest vigorously, resulting in pressures through IATA for a much higher surcharge, or the whole pattern of scheduled air fares could be changed, with abandonment of first-class fares on subsonic routes where there was Concorde competition, in favour of a two-tier or even three-tier subsonic fares structure, catering specifically for traffic that did not want Concorde's first-class service. In fact, it is possible that the advent of Concorde on many routes could result in a complete reorientation of the fares pattern, as it has evolved in the interline agreements. BA will be able to take Concorde on to other places, such as Bermuda, the Bahamas, Miami

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rate, equivalent to current economy-class, and a special "business" class at a fare higher than economy but still below first-class level, that would cater for those businessmen who could not afford Concorde rates but still wanted a reasonably higher standard of service than Concorde could provide. Whether this will happen, of course, depends entirely upon how Concorde performs in the services now starting.

Mr. Davidson's fourth objective has been to make sure that the service on the ground is right. "There is little point in flying at twice the speed of sound if the customer has long waits before departure, or the aircraft has a poor schedule-keeping reliability, or there are delays at the destination for customs clearance or baggage delivery," he says.

BA has already done much to achieve these aims. In the U.K., at Heathrow, "Concorde" road signs point to the new terminal check-in area inside Terminal Three, which is tastefully decorated, and provides a pleasant area in keeping with the ambience of Concorde. From the check-in area—where passengers will be able to check-in at a time much closer to departure than is normally the case—they will be taken to the waiting Concorde which will be at Gate 2, as close as possible to the check-in area.

Immigration

For returning passengers, there will be an ultra-fast baggage-unloading and delivery service to the Customs hall, where facilities have already been speeded by the provision of the Green "nothing to declare" Channel. Little can really be done to speed immigration facilities, which are required in law, but because of the comparatively small number of Concorde passengers—less than 100 on average—the immigration delays should not be too difficult.

Finally, Mr. Davidson has stressed the importance of really superb cabin service and food. "Because of the shortness of the flights, we see no need for gargantuan feasts, but we are making quite sure that the meals are of the highest conceivable quality and that the very highest degree of individual passenger service is supplied." No fewer than 212,000 pieces of special Concorde tableware have been ordered from Royal Doulton, and cocktails will be served in high-quality "blown" glasses. A typical menu might be caviar, followed by breast of pheasant, Soufflé, with endive, membrillo, fresh asparagus spears and Anna potatoes, followed by Concorde soufflé, cheese brand and coffee, with, appetites, wines and liqueurs.

A high degree of comfort combined with ultra lightweight has been designed into the passenger seats, which recline for sleeping, have adjustable headrests and are wired to provide five programmes of in-flight stereo entertainment. At the front of both passenger cabins there is a "Machmeter" to inform passengers when they are flying faster than sound. This is the only indication that they will get as to when they are going through the sound barrier to supersonic speed.

As Mr. Davidson stresses: "We must never forget that exclusivity is part of the Concorde charisma. It is very much an executive aircraft. It is specifically designed for the fairly small group of people to whom time really does mean money. And it represents remarkable value for money."

M.D.

To us, Concorde is just as much part of our history

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Government may well now take the advice offered to it in the have been sold. It is still not too late to take this step, and if it is done over the next six months, it might ensure the not want Concorde at all. To some extent, the activities are all part of the normal process of negotiation of bilateral air agreements, with the Concorde an additional factor to be taken into account. But it must be admitted that this political factor has made the task of negotiating Concorde rights much more difficult.

Thus, there is another reason for hoping that now it is going into service, even on a limited basis initially, Concorde will be able to show that it is not quite the noisy, fearsome, while they are able to get the financing arrangements for the new generation of aircraft. There is no reason why this same system U.K. some have suggested that for some time—there is a capable of Concorde in the U.K.—indeed, agreements with the U.K. and air transport system with a had it been so applied years ago, French airlines should be minimum of disruption.

CONCORDE III

For France Concorde has become the symbol of Gaullist insistence on independence from U.S. technological domination. There has been little criticism of the project.

France's stake

FRANCE, Concorde has famous look on the technology been a simple aircraft logical gap between the U.S. and Europe by Jean-Jacques Servan-schreiber has been a leitmotif foreign and industrial policy of French political and economic life. No one in a responsible position has ever thought General de Gaulle came to the conclusion of abandoning the power in 1958. Unless the European have never really means can keep up with the denuded British doubts and Americans' industrial and technological progress, or at least have looked upon them as prevent the gap from widening, a symptom of political independence or play down the traditional role of a leading power, in the vanguard of technological progress. The French, in the new Gaullist era, may pride themselves on their newly-discovered sense of national independence, but their attitude towards Concorde has been the keep the project going. When the British Labour Government, in 1974, was in power, it was a secondary concern, two or three years after the creation. The primary objective since the inception of the project in 1962 has been to ensure that the French aircraft industry and French and European technology should remain competitive with the U.S. "American de Gaulle who was prepared to allonge" — the title of a use such tough methods. His

successor, President Pompidou, too, went to extraordinary lengths to defend Concorde. It is an open secret that Mr. Edward Heath, the former Conservative Prime Minister, was obliged to give M. Pompidou a firm undertaking that Britain would go ahead with the project before giving the green light to British membership of the Common Market. Nor has there ever been any really effective opposition by the French public to Concorde. General Henri Ziegler, the former chairman of Aérospatiale, the French partner of the British Aircraft Corporation, was originally opposed to the project because he foresaw the difficulties of making Concorde profitable and of gaining the approval of the U.S. authorities for landing rights. M. Servan-Schreiber, top, waged a typically quixotic campaign against the aircraft. But they were crying in the wilderness. The vast majority of the French people, who have a greater tendency than the British to shut their eyes to the relationship between the

taxes they pay and public spending, have been happy to espouse their Government's interpretation of why Concorde remains a desirable project. There has been no real anti-Concorde Press campaign, nor has the media devoted anything like the space that British newspapers and television have done to airing the very real cost, financing and environmental problems involved. It is hardly surprising, therefore, that most French people and not a few commentators look upon the obstacles which Concorde is faced with in the U.S. as a plot hatched by American aeronautical interests and politicians more concerned with their own electorate than international relations. Most of the officials and representatives of the French aircraft industry and Air France, who participated in the hearings in Washington, it is true, have privately expressed their appreciation of the manner in which the proceedings have been conducted and the impartiality of Mr. William T. Coleman, the U.S. Transportation Secretary. But

to the uninitiated, who form the bulk of the population, the Americans are again up to their old tricks of trying to thwart and dominate the Europeans. If Concorde is not granted landing rights, this will undoubtedly provoke a strong public reaction in France and neutralise much of the progress achieved by President Giscard d'Estaing and President Ford in cementing Franco-American relations. The French trade unions, like their British opposite numbers, have already threatened that they will urge airport workers to boycott U.S. aircraft and will call for a national boycott of American goods if landing rights are refused. Indeed, the whole affair could well escalate into one of those destructive Franco-American rows which President Giscard has tried so hard to avoid since coming to power in the summer of 1974.

Optimistic

So far, however, France remains officially optimistic that all will come right in the end. M. Giscard, himself, has done his best to reassure public opinion by stating firmly that he would fly in Concorde when he pays his official visit to the U.S. in May. He could, of course, land at a military airport even if rights are refused in Washington and New York, but the general assumption is that he is confident of being able to land at Washington. What most commentators here fear is that some kind of political compromise will be only 12 to 15 per cent. Admittedly, the novelty of flying by Concorde will wear off, but the supersonic aircraft saves so much time that Air France is convinced that it will remain a winner on this route. One of the problems facing the French airline is that only 40 per cent. of the Concorde production of the whole Concorde programme, particularly since it is already faced with a

SUPERSONIC AIRLINERS—THE BASIC FACTS

	Anglo-French Concorde	Soviet Union Tupolev TU-144
Speed	Mach 2.05 (1,354 mph)	Mach 2.2 (1,430 mph)
Range	4,000 miles	4,000 miles
Payload	100-125 passengers (approx.)	up to 140 passengers
Engines	Four Rolls-Royce (Bristol) Olympus 593s	Four Kuznetsov NK-144s
Max. Take-off Weight	400,000 lbs	396,530 lbs
Estimated Price	£20m-plus (depending on spares and equipment installation)	Not available

Source: Jane's All The World's Aircraft, 1975-76, BAC & Aérospatiale.

European centres if the service is to be viable in the longer run. The connecting flights published by Air France in its latest timetable are not wholly reassuring on this point. If a passenger leaves from London or Milan to Rio, for instance, he saves little more than two hours on the total journey, compared with a subsonic flight from his own city. It may well be asked whether businessmen will consider this worth all the trouble of changing aircraft. The Paris-Rio service will be followed by a once weekly flight from the French capital to Caracas on April 1, and if all goes well—a big "if"—a once-daily service between Paris and New York on May 1 and three flights a week between Paris and Washington on September 15. Originally planned services by Air France to Beirut and Buenos Aires have been abandoned for the moment because of the unsettled political situation in Lebanon and Argentina, but other services such as Paris-Tokyo via Siberia, Paris-Sydney, Paris-Mexico and Paris-Singapore are currently under study.

Although Air France has emphasised that it does not intend to treat the Concorde traveller as a "privileged" passenger, he will in practice be treated as such. A special bus service reserved for Concorde passengers will take them from the town air terminal to the French capital's space-age new airport, Roissy-Charles de Gaulle, where baggage-handling and customs checks have also been speeded up and simplified for their benefit.

Not the least of Air France's problems, as in the case of British Airways, has been the financing of the whole Concorde programme, particularly since it is already faced with a £400m. loss for 1975. The total cost of the four aircraft which it has purchased, including the necessary spare parts to operate it, comes to about £1.5bn. (some £165m.), obviously not an expenditure which the airline could contemplate without massive State aid. This, as might be expected in France, was forthcoming without too much trouble. The State has agreed to help the company to the tune of £440m. in the form of an increase in its capital and also to assume much of the burden of the interest payments that will have to be made on the remaining £1.1bn. which the company will have to borrow. But the latter commitment remains somewhat vague and another question-mark hangs over the cost of spare parts. Originally costing on the basis of 50 aircraft, it is almost certain that their price will be higher than originally estimated now that only 16 Concorde are being built.

But when all is said and done, and even if Concorde turns out to be a commercial failure, it will forever stand as a monument to Anglo-French co-operation. An account by one of those responsible for the programme on the French side between 1962 and 1969, M. Jean Forestier, in the French magazine "Aviation International," gives a hair-raising insight into the national prejudices and interests which had to be overcome before the aircraft's first bolt was ever riveted into place. That in spite of all these tensions and differences thousands of engineers, managers and technicians from the two countries were able to produce a plane which, whatever its drawbacks, marks a technological revolution, must surely be considered as one of Concorde's greatest achievements.

Robert Mauthner
Paris Correspondent

MILESTONES ON THE SUPERSONIC ROAD

1946-51	Start of supersonic aircraft research in Europe.	1973, September 20	02 lands at Dallas/Ft. Worth to commence first visit to the U.S.
1951-52	Feasibility and design studies.	1973, December 6	First production Concorde flies from Toulouse.
1952, November 29	Preliminary British/French discussions.	1974, February 13	Second production Concorde flies from Filton.
1957, December 11	British and French Governments sign agreement covering the joint design, development and manufacture of an SST.	1974, February	Cold weather trials carried out in Fairbanks, Alaska, by 02.
1958, March 2	Roll-out of first prototype at Toulouse.	1974, June 14	First supersonic flight over a U.S. domestic route—between Boston and Miami.
1959, April 9	First flight of Concorde 002 from Filton.	1974, June 17	First double crossing of the North Atlantic.
1959, October 1	Concorde's first supersonic flight.	1974, August 7-September 2	Second production Concorde visits Persian Gulf and Singapore for hot weather trials.
1960, November 4	Mach 3 exceeded for first time by 001.	1975, July 7	Development flying programme begins as part of process towards award of Certificate of Airworthiness.
1961, May 13	Concorde makes first automatic landing.	1975, October 9	French Government awards Concorde its Certificate of Airworthiness.
1961, May 25	001 flies 2,300 statute miles to Dakar in 2hrs. 35 mins on first overseas flight, halving subsonic times.	1975, December 5	U.K. Civil Aviation Authority awards Concorde its Certificate of Airworthiness.
1961, December 17	01—first pre-production Concorde flies from Filton.	1975, December 19	First Concorde delivered to Air France.
1962, June	002 visits Australia, Middle and Far East.	1976, January 15	British Airways takes delivery of its first Concorde.
1962, July 28	British Airways orders five Concorde's and Air France four.	1976, January 21	British Airways and Air France start fare-paying passenger services.
1962, October 5	Iran Air signs an initial purchase agreement for two Concorde's and an option for a third.		
1963, January 10	02—the second pre-production Concorde, and the fourth to fly—makes its maiden flight from Toulouse.		

You could almost call it the Alcan Concorde.

To build an aircraft such as Concorde required high technology materials—so it was hardly surprising that the British Aircraft Corporation and Aérospatiale called in Alcan. After all, Alcan, Britain's leading aluminium company, had just what was needed: expertise, research facilities and production capability. And they delivered the goods in

no uncertain style—an aluminium alloy that was stronger and superior to any they had ever manufactured before. This, plus a wealth of experience gained as a result of decades of applied research and development for the aerospace industry. So, although it's not called the Alcan Concorde there are good reasons why it could be.



Where you'll find Alcan aluminium in Concorde

- Forward fuselage, forward nose, rear fuselage, droop nose, rudder, fin, air intake, engine bay nacelles.
- Centre-wing, forward wing, outer wing, intermediate fuselage.

The world's environmental lobby has fought a continuous battle against the Concorde project, culminating in the recent hearings of the U.S. Department of Transportation. Arguments have centred on four major topics: sonic boom, high-altitude effects, air pollution and noise.

A high-contrast, black and white photograph showing a close-up of a person's face, heavily shadowed and textured, possibly wearing a mask or having a very rough skin surface. The image is grainy and abstract, with a dark, curved shape in the foreground.

The first Concorde for British Airways seen taking off during its flight trials prior to delivery last week. A feature of the production models is the low volume visible smoke, which has been one of the improvements made to the engine part of the efforts to achieve social acceptability.

special trials conducted in
blanca earlier last year.
presence of U.S. Federal
tion Administration.
They say that this mail
is safe—it is in fact a
by the British Air Line
Association, and is but
the Certificate of Airway
requirements for the ac
and approved by the
Aviation Authority at
French equivalent, the
tariat Générale L'A
Civile.

It is the take-off and landing noise, however, which is undoubtedly likely to be the biggest single obstacle to the spread of Concord operations world-wide, just as this has already proved to be the biggest issue in the debate on granting rights for Concord to fly into the U.S. It is because of this noise that the airlines are anxious — one that Concord is, say, a noiser. For example, take the current generation of wide-bodied jets, and on a par with (although some would say greater than) the noise levels of many existing subsonic jets of the Boeing 707, VC-10, and DC-8 class still using many of the world's major airports.

It is the manufacturers' contention that because the take-off

have appeared to ignore the fact that the planned Concorde operations of six flights a day

the attitudes of world airlines to Concorde's introduction to passenger service. Success for British Airways and Air France would undoubtedly boost confidence among other possible users.

operation and the more operating economics will be provided by SAC as spatial are of use, in evaluating the air their own use, it will be operational evidence British Airways in France, which will be the final analysis. While the price of the air around \$50-60m, and opinion still fairly in airlines will think to hard before committing, themselves. At present there to be far too many factors—both in operation can have fund effects—for airlines to decisions of this magnitude.

In the manufacture on Con economics, they have estimated, assumed an utilization of 3,600 hours annually, compared to 4,000 for subsonic aircraft, at price has been set at cents a gallon. Both are factors which, along with others, will determine the future of airlines toward costs. But whatever the be, none will be wise to the supersonic era now nging.

cause damage in the upper atmosphere, such as depleting the ozone level so as to permit an increase in the volume of harmful ultra-violet radiation reaching earth, is one of the most controversial topics surrounding the whole future of supersonic aviation. After extensive scientific analysis and debate, the most recent conclusion emerging from the final Environmental Impact Statement (EIS) prepared by

Presented with a mixed class lay out, some first class passengers preferred to fly 'Concorde' at coach class fares. Furthermore, the stimulus effect of reduced journey times has increased the number of total business passengers by 12 per cent. Typical first class market penetrations were as follows for single class configuration at first class fare plus 20 per cent: New York-Western Europe 86 per cent, West Coast-Far East 85 per cent, West Coast-Hawaii 99 per cent. For two class configuration, with first class fare plus 20 per cent, and coach class plus a surcharge of 30, per cent, penetration would be as follows: New York-Western Europe 91 per cent, West Coast-Far East 80 per cent, and West Coast-Hawaii 77 per cent.

Lorne B:

Although this type of infor-

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Dr. Peter Dinklage, 44, has been blind since birth. He has spent his life with the kind of uncertainty that the British

 **The St.**



Strong & Fisher Group

The Soviet Union rather played down the start of its first regular supersonic air transport service when it opened between Moscow and Alma Ata on Boxing Day. The Russians are following the progress of Concorde with great interest, but it is not known if they will compete on world routes.

The Soviet challenge

MONTHS' launching of Soviet Union's regular supersonic air transport service was an exercise in caution. Aero-Boxing Day mini-extravaganza inaugurated weekly four-hour runs by the Tupolev TU-144 between Moscow and Alma Ata, 1,900 miles to the south-east in Central Asia. But despite the occasion, flight number 9021 carried no Government dignitaries—not even the Civil Aviation Minister—and its payload consisted of freight and mail, plus a handful of local journalists and "experts." Newsprinters, radio and television reporters, and the Soviet people with uncommon reserve, as great an engineering feat as Tass News Agency, when it took pictures of the Moscow take-off for distribution in the west, replied that its two photographers were themselves aboard flight 9021 and thus only sound shots made after rival in Alma Ata would be available. One was led to believe the take-off was such a routine, or maybe unpredictable, affair that Tass dispatched its two photojournalists to Moscow airport to record it.

Only the Army daily was permitted to crow a bit. It quoted Lt-Col. Nechayuk, an engineer and one of the "experts" on the inaugural run, as boasting that "just a few governments in the world have within their power to solve a complex problem—a job directed at joint development of the Anglo-French Concorde."

In fact, the low profile of the TU-144's regular service debut would come as no surprise, nor would it be considered unless it were well clear in the coming months from the entire ST issue as it is thrashed out in the west. The Soviet Union certainly has a common interest with Britain and France in see-

ing successful supersonic flight, but the need for success is not nearly so pressing, and at present it seems unlikely that the Russians will do much, if anything, to help promote the SST abroad. Likewise, few experts believe the TU-144 will be presented to the world as an alternative to Concorde in the near future. As with the December 26 inaugural flight, caution seems the word.

Several reasons lie behind this. First, overall development of the TU-144 clearly is not as advanced as that of Concorde. Lt-Col. Nechayuk notwithstanding, it seems evident that beating their Anglo-French rival into service was less important to the Russians than fulfilling a pledge to the people to have their own craft operating regularly by the end of the 1975-five-year plan—a goal they achieved with just five days to spare. Internal morale must have played a role, too, in light of the disastrous 1973 harvest and the need for a triumph of Soviet industry that could be played up at next month's Communist Party Congress in Moscow. As such the Moscow to Alma Ata run will be little more than an expanded test programme until passengers are allowed to board during the latter half of 1976.

Readiness

The fact that mail and freight alone will be carried initially is the most significant indicator of the state of the aircraft's readiness. There are others. One crewman on the inaugural flight, for instance, told a Soviet correspondent that only the crews had "fully mastered" operation of the aircraft, which suggests that limited service will be available for the time being. Likewise, the few newspaper accounts that the Soviet Press has carried laid emphasis on lay-

preparations for the aircraft's "exploitation" rather than its "preparedness," and this was the case up to early December. According to Western aviation experts, there are still technical problems with the TU-144, namely vibration at low speeds and excessive fuel consumption. In the latter case, the situation is so serious that it has ruled out for the time being non-stop flights on the long runs from Moscow to the Soviet Far East—cities almost 4,000 miles away—and necessitated triangular runs with stops first in Central Asia.

No doubt Soviet officials also feel a need for extra caution on the safety factor. Although Deputy Civil Aviation Minister Nikolai P. Bykov told a recent news conference "we have found no dangers" connected with the aircraft, the crash of the TU-144 prototype at the 1973 Paris Air Show with a loss of 13 lives must be vivid in the minds of planners. They can afford to take no chances. The prestige of Soviet aviation is on the line at a time when the Russians are trying to break into western markets as producers of passenger aircraft, so it is necessary for them to present the image of careful, patient and quality-bound manufacturers.

Similarly, a little publicised debate is believed to be going on in both scientific communities and among better informed citizens of the Soviet Union on the environmental effects of supersonic flight. Mr. Bykov as good as admitted this when he announced that the Moscow-Alma Ata run had been chosen for initial TU-144 service because it avoided densely populated areas and allowed time for studies to be carried out. Apart from the remarks of a geographer who questioned the impact of an SST on the ozone layer—the same question raised

by most American critics—the Soviet Press has carried very little about the discussion. In any case it seems unlikely that it could reverse the decision to press ahead on the project should political considerations dictate otherwise.

But at least until the environmental aspect is clarified—perhaps even by tests carried out in the West as well as those by the Soviets themselves, and until all technical wrinkles can be ironed out, few can expect the Russians to risk their prestige on world markets by pushing hard with the British and French to promote supersonic flight.

Planners

There is a second reason for Moscow's caution, that is, whether SST flight will prove a viable proposition. Certainly Soviet planners will be watching carefully as British Airways and Air France scramble for the lucrative routes—the North Atlantic and U.S.-Japan—provided that SST flights into the U.S. are permitted. Then they will want to see if the project can be made to pay in terms of passenger acceptance.

Of course, all means of public transportation in the Soviet Union are State-owned and Soviet policy has been that the Government must absorb huge losses to keep fares low. Therefore, it is not nearly as vital for the future of the TU-144 that it be a paying venture as it is for its rival. Then again Soviet planners may prefer to speed two or three years developing the internal TU-144 service, watching to see what happens in the West, and then make a decision to expand to international services. Either way it could come out ahead—by competing successfully later with Concorde internationally or by operating at a loss internally.

A third reason for Soviet caution may be the sheer legal complications of international supersonic flight. Air routes from London or Paris to New York can be adjusted with relative ease to pass over small land areas and then on to vast uninhabited ocean. The Soviet Union, in turn, could fly its TU-144 out of the country via Central Asia or on the Trans-Siberian route to Japan. But to get the craft out to the West and thus to the much-coveted North Atlantic run would mean passing over three or more Western countries if the route is to be economical. No doubt extensive rewriting of civil aviation agreements would be needed, which is always difficult with Moscow because of the reciprocity they usually require.

At present the launching of such a time-consuming process as examining the agreements seems several years off. Soviet officials have stated that they won't even consider talks on the subject until the TU-144 has proved it on internal passenger routes. So in the meantime it seems unlikely that the Russians will come out to support supersonic flight internationally.

Yet all of this pre-supposes that the Soviet Union seeks to compete with Concorde outside Soviet borders—which may not be the case. In that situation one might ask, why should the Russians back SST to assist the British and French? In a country of such immensity, with so many areas requiring a strengthening of the transport system, with the industrial centres spread over such distance and with growing numbers of travellers, Soviet leaders may simply feel they can operate the TU-144 successfully without it ever going abroad except for occasional prestige flights.

By a Correspondent

CONCORDE THE TIME SAVER

(Some examples of how Supersonic Airliners will "shrink" the globe by cutting travelling times)

Route	Approx. Present Schedule Journey Time hr. min.	Concorde Journey Time hr. min.
Acapulco—New York	4.50	2.55
Auckland—Los Angeles	15.15	8.40
Auckland—London	28.40	17.05
Bogota—Paris	12.00	6.45
Bombay—New York	23.20	10.35
Boston—London	6.35	3.10
Buenos Aires—Lisbon	13.30	8.10
Buenos Aires—Mexico City	13.00	5.55
Buenos Aires—Paris	14.50	9.10
Caracas—Paris	11.10	5.45
Honolulu—Los Angeles	5.15	2.30
Honolulu—Melbourne	10.00	5.50
Lima—Paris	16.30	7.30
London—New York	7.05	3.30
London—Melbourne	24.00	13.15
Los Angeles—Tokyo	17.40	9.05
Los Angeles—Paris	13.00	6.15
New York—Tokyo	7.30	3.35
Paris—Tokyo	14.40	7.30
Paris—San Francisco	9.30	3.50
San Francisco—Melbourne	15.10	6.50
Singapore—Melbourne	17.55	9.10
Singapore—Tokyo	7.50	4.35
Tokyo—Honolulu	8.10	3.15
Tokyo—London	7.25	3.35
Tokyo—London	14.40	6.45

far as its take-off and landing noise is concerned.

Mr. Coleman has pointed out that Concorde is likely to annoy more people than subsonic jets, not only because they will regard its noise as being greater than that of subsonic jets, but also because its noise is distinctive and readily identifiable. It has a higher proportion of low-frequency sound in the overall noise generated, which propagates more readily through the atmosphere and is audible at greater distances than the high-frequency sound generated by conventional jets. Thus, it seems that several things will have to be done.

First, the existing noise abatement procedures will have to be refined to a much greater pitch than at present, so as to ensure that maximum height concomitant with safety is reached over built-up areas as soon after take-off as possible.

Secondly, so far as is possible, the routing into and out of airports should be over areas of low population density, even if this means providing special Concorde flight patterns at airports like Heathrow, while supersonic corridors should be negotiated and strictly adhered to for en route supersonic cruise.

Thirdly, technical efforts are continued to reduce the noise levels from the engines as far as possible, and that as soon as any new noise-reduction technique is demonstrated as feasible it is incorporated in the aircraft. The most effective technique of all—the development of new engines for the Concorde—would be so expensive that it has to be accepted that it cannot and will not be done during the life of the first-generation aircraft, and that only when any second-generation aircraft is developed will any significant improvement in take-off noise levels be likely.

In the meantime, there is some truth in the claims of both sides in the great noise debate. Concorde is undoubtedly noisier than many people had hoped it would be. At the same time, some of the anti-Concorde propagandists have exaggerated their claims. The true balance between these two extremes will be proved over the next few months, while Concorde flies into and out of Heathrow on its regular passenger services. In the final analysis, Concorde is likely to determine its own "social acceptability" by virtue of its performance over the next few months.

M.D.

Acceptability

CONTINUED FROM PREVIOUS PAGE

110 PNdB, while six only Concorde is "twice as loud" as slightly exceeded that level, at 707s and DC-8s, and "four times as loud" as newer wide-body jets. This, it is argued, is in the 112-114 PNdB class.

In addition, it is pointed out that at Heathrow, the British Airways' movements will contribute less than 1 per cent. of the total volume of aircraft movements there. At Washington's Dulles Airport, moreover, there will be two Concorde based instruments, on a logarithmic scale.

On such a scale, an increase of 2 Perceived Noise Decibels shows as a 20 per cent. increase in noise, whereas in real life the fact that pilots on the air-2 PNdB is the smallest difference in noise which the human ear can detect. As a result, readings on a scale are translated into claims that the aircraft is several times noisier than other aircraft, when in fact this is not so.

The makers are also at pains to refute claims made by detractors from the fact that Concorde is going to continue to fly from people on the ground so far as its take-off and landing noise is concerned.

Mr. Coleman, U.S. Secretary of Transportation, that from people on the ground so

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CONCORDE VI

While debate in the U.S. has ranged wide over Concorde, the key issue is whether it will be allowed to land at New York's Kennedy Airport. Environmental rather than national aspects have been at the forefront.

New York nexus

IF ANY one factor has cast could scarcely have been foreseen when the aircraft began to be designed some 15 years ago. It is that the Anglo-French aircraft will not be flying to New York on the route it was originally intended to exploit before all others.

Instead the aircraft is still mired in the long debate about the supersonic aircraft which began when the U.S. was planning its own SST and has continued intermittently here ever since. The hearings which were held in Washington earlier this month are the latest in a long line of reports, investigations and congressional inquiries about supersonic flight.

And even if the Secretary of Transportation, Mr. William Coleman, decides to allow the aircraft to land—and he must make a decision within a month—Concorde will by no means be out of the wood. Apart from the attempts which will almost certainly then be mounted in Congress to stop it there are likely to be challenges in court, particularly in New York, where environmental and citizens actions groups are already preparing cases to be advanced if necessary.

For Concorde's makers, and for the British and French Governments, the strength of this opposition has been a major blow, the more so because it

But such speculation is for the moment very much for the next decade. Mr. Coleman faces a decision in less than a month which will at least be a major step in Concorde's history even if it is not a conclusive one. He is well aware that whatever decision he makes will not and cannot satisfy everyone. He must choose between the Scylla of allowing the aircraft into New York and profoundly irritating thousands of people living near Kennedy Airport and the Charybdis of angering two of America's closest allies and possibly violating long-standing aviation treaties.

Ozone layer

The arguments against the aircraft have centred on its noise and, to a lesser extent, on the possible depletion of the ozone layer for which it may be responsible. The debate about the noise is a complicated one, involving different standards of measurement, largely subjective assessments of individual noise nuisance and comparisons of noise with that made by other types of aircraft. Allegations of inaccurate or misleading noise measurement have been made by both sides, and even the British Embassy took the unusual step of publicly criticising a U.S. Government agency for what it called mistakes in its evidence about the aircraft's noise. But while the aircraft's supporters have argued that Concorde's noise levels have been much exaggerated, its opponents have taken the opposite view and claimed that its noise is of a wholly different order from existing aircraft noise and likely to be the final straw for many thousands who already have to endure excess noise around Kennedy Airport. The depletion of the ozone layer, which once seemed a very strong environmental stick with which to beat Concorde, is now a little less of an issue, partly because latest scientific evidence appears to cast doubt on previous assumptions that Concorde on its own would seriously deplete the ozone layer. Even the fact that the aircraft may cause an extra 200 cases of skin cancer a year, when set against the over 100,000 cases a year in the U.S. alone, seems less serious than perhaps it did in the past. At the hearings it was clear that Mr. Coleman listened closely to the evidence about noise and that he was particularly impressed by the volume and intensity of opposition from New York on the subject. Certainly it is difficult to find any politician in New York who has a good word to say for the aircraft.

But away from the east coast there are a number of airports who very much want to be able to receive Concorde. In particular the giant new airport at Dallas-Fort Worth would be happy to have Concorde to help it develop itself as a major centre of aviation in the growing south west of the U.S. Dallas Airport officials see Concorde as attracting feeder traffic from a wide area, which would greatly increase the airport's attractiveness as an aviation switching centre for the area.

Unfortunately this generation of Concorde does not have the range to make it to Dallas without an interim refuelling stop. It is possible that if Concorde were to refuel at Gander it could get to Dallas or Miami or that if it were to be allowed to fly to Washington it could then go on to Dallas. But given that the aircraft will have to fly subsonically over land, and the time taken to refuel Concorde's overriding advantage in terms of flight time may be whittled away, particularly when set against the new Boeing 747s, which have longer range than existing jumbos and can cut out time-consuming refuelling stops.

Nevertheless the fact that some airports do want the aircraft encourages its makers, who are still convinced that as soon as businessmen start to use the aircraft they will appreciate its advantages in terms of time over subsonic aircraft. They believe this will come to mean a great deal to people in areas like Dallas and that a way will be found to get Concorde to Texas even if it should be banned from New York and Washington.

Unlike New York, of course, Washington has an airport that

was specifically built a long way away from major population centres specifically because of this means that on very hot days Concorde may have to fly empty seats if it is to get to Dulles safely. This problem may not occur very often, and does not of itself make very much difference to the aircraft's economics, but it is another complicating factor for the airlines.

Indeed any discussion of alternative points of entry for the aircraft serves only to underline the overwhelming attraction of New York, which still receives something like 70 per cent of the international air traffic coming to the United States. The transatlantic market—some 40 per cent of all international travel—is the most natural one for the aircraft to serve. New York is well within range and it is the place where the majority of travellers still want to go.

Expensive

While that must be a possibility Concorde is weakened by the fact that it carries relatively few passengers and, that its fares will be very expensive so that it can be used only by a small part of the travelling public. The airlines note that although first class business traffic of this kind is a small part of the market in terms of numbers, it is a much larger proportion of total airline revenue than the figures might suggest. British Airways and Air France, which believe that once Concorde was allowed to land, it would very quickly draw traffic away from other carriers, who would soon notice a significant fall in their first class business. Any aircraft that is certified as a further possible drawback for the aircraft, which is partly conceded even by Concorde's supporters, is that its range is really only just adequate to get right and that in any case they

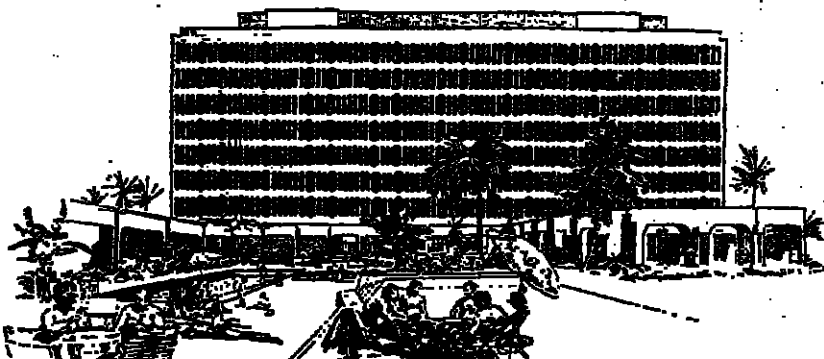
do not apply to entire situations such as the one that has arisen over Concorde. France and Britain argued that indeed there rules at all which apply to the aircraft, and that the far stricter regulations, which exempt supersonic aircraft, are "binding" as it moves in Concorde's favour. But this is a year and a half ago and Concorde has not yet been built. Mr. Coleman's decision is likely to be that he will allow the aircraft to land at Kennedy, but that it will be subject to a new set of rules, which will be more stringent than those which apply to other aircraft.

For the moment, Mr. Coleman's decision is likely to be that he will allow the aircraft to land at Kennedy, but that it will be subject to a new set of rules, which will be more stringent than those which apply to other aircraft. Mr. Coleman's decision is likely to be that he will allow the aircraft to land at Kennedy, but that it will be subject to a new set of rules, which will be more stringent than those which apply to other aircraft.

Whatver the decision, the long debate about Concorde will continue. Congress on the courts, yet more hearings, for times there are more British and French

Whatver the decision, the long debate about Concorde will continue. Congress on the courts, yet more hearings, for times there are more British and French

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In a remark which earned him appearance on many American front pages the following morning, the Bishop told Mr.

U.S. Secretary of Transportation William Coleman presided earlier this month over exhaustive hearings about Concorde and heard impassioned witnesses both for and against the aeroplane landing on American soil. The essence of the exercise turned on one key subject—noise and who will suffer from it.

Washington hearings

THE EIGHT hours of public hearings about Concorde which took place in Washington earlier this month were almost certainly the most exhaustive ever held about the Anglo-French aircraft in a single day.

While the American Secretary of Transportation, Mr. William T. Coleman, presided, like a judge sitting without a jury, a steady stream of witnesses argued both for and against the aircraft with equal passion. Nothing quite like it has been held before in Washington and the Secretary said from the outset that he was determined to decide whether or not to allow Concorde to land in Washington and New York on the basis of the testimony at the hearings, plus the enormous amount of written evidence which has also been submitted to him.

One image sticks above all in the minds of many of those at the hearings. It is of the Rt. Rev. Hugh Montefiore, Bishop of Kingston-on-Thames, and president of the Heathrow Association for the Control of Aircraft Noise. To the delight of the television networks, he delivered an impassioned denunciation of the aircraft, accused the British Government of being less than honest about the real noise of the aircraft and said that the U.S. would be doing Britain a service if it were to ban Concorde.

In a remark which earned him appearance on many American front pages the following morning, the Bishop told Mr.

like hell "because that goes on for ever. It is more like a secular form of purgatory."

The Bishop's testimony, which has since been widely criticised in Britain, and dismissed by the British Minister who was sent to the hearings as being a "music hall turn" may have been a little flamboyant, but there was no doubt that he concentrated on the one issue that Mr. Coleman is also known to feel is the overriding one which he has to weigh—noise, and whether Concorde meets or breaches U.S. noise regulations.

This became the overriding question as the hearing wore on. This has not, of course, made Mr. Coleman's task any easier, as there is very little agreement about the amount of noise the aircraft makes or more accurately about the amount of noise that people hearing it will think it makes. The argument is a technical one about the relation between Perceived Noise Decibels and actual Decibels, about the noise footprint that the aircraft will make as it takes off and lands and about the "extra" noise that makes, bearing in mind that there are other aircraft in the sky at the same time.

Measurement

The British and French teams have all along argued that the individual measurement of Concorde's noise overstate the real noise that the aircraft makes, because they fail to take into account that at any given moment there is a lot of other noise quite apart from that of aircraft.

Quite what Mr. Coleman made of the array of witnesses to whom he listened so patiently will not, of course, be clear until he issues his verdict on the aircraft and that is unlikely to be before the deadline that he set himself expires on February 4. Certainly he won praise from all sides for the fair-minded way in which he conducted the proceedings and he never for a moment gave away his own views on the issue. Equally the environmentalists saw the hearing as a major step forward as it was the most comprehensive discussion of the environmental impact of a new piece of technology ever held in a single day and they see this kind of approach to environmental problems as very important for the future.

Some of the British opponents of the aircraft argued privately during the hearings and have

since, argued publicly in England that there should have been similar hearings in Britain about the aircraft and that if there had been a number of different decisions might then have been taken. They too were impressed by the procedure and like everyone else were convinced by Mr. Coleman's assurances that he would not make up his mind until he had heard the evidence.

Yet if Mr. Coleman was hoping that the process would of itself suggest a solution and that the evidence would have been sufficiently one-sided either for or against the aircraft to make his decision for him he was surely very disappointed. For impartial observers were made aware as never before of how finely balanced the arguments were. Mr. Coleman has an unenviable task.

Mr. Coleman distributed a series of questions to which he wanted answers in writing about the status of the aviation treaties under which Britain, France, and the U.S. allow flights between the three countries. Britain and France have since replied unequivocally suggesting that to ban Concorde would be a breach of existing treaties which they would view extremely seriously.

While the British and French teams played this issue down during the hearing—no doubt for fear that they would be accused of threatening the other side before even a decision had

been taken—the anti-Concorde group took special care to mission a lawyer to argue the existing rules of other new aircraft. At last week the Environmental Protection Agency new rules which would bind Concorde under rules dating from 1971 would effectively exclude aircraft.

It may well be that technical details and soundings that it will be a narrow issue of the two and on the applicability of law in the light of Mr. Coleman's decision made. If he should decide the treaties do require to accept the aircraft almost certain that it be another round of—this time in court, eventually the Supreme

While Britain and France welcome the effect to delay still further the prospect of Concorde landing at Kennedy. So even though the were billed as the 21st anniversary of the signing of the Anglo-French treaty there are likely to be occasions on which the witnesses gather to a equal passion, the case is fast becoming a part of American history.

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CONCORDE VIII

The engine which powers the airliner —the Olympus 593—is the most extensively tested engine ever to enter airline service, and is the fruit of 25 years of painstaking development.

The engine at the centre

THE CONCEPT of a supersonic airliner from the start depended upon the availability of an aero-engine which could meet the extremely exacting new requirement—that of operating for long periods at speeds faster than that of sound during normal cruising flight. The choice of a suitable candidate finally settled on the Bristol Siddeley Olympus (that company subsequently becoming part of Rolls-Royce) around 1960, when the detailed studies of a possible supersonic airliner were under way in Britain and France. The Olympus had been developed initially for military use, and powered a number of aircraft, including the Vulcan V-bomber and the TSR-2 tactical strike-reconnaissance aircraft. Its subsequent evolution into the Olympus 593 for Concorde has been the work of Rolls-Royce (1971) and Snecma (Société Nationale d'Etude et de Construction de Moteurs d'Aviation) of France, with the work broadly being shared with 60 per cent carried out by the U.K. company and 40 per cent in France. The U.K. National Gas Turbine Establishment at Pyestock has also played an important role.

Explored

For the Concorde application, however, new areas of technology had to be explored, due mainly to the fact that a supersonic power unit operates in a far more arduous environment than a conventional subsonic engine. Operating temperatures, for example, are higher, creating the need to use special heat-resistant materials and other measures.

The engine, on which test experience now exceeds 50,000 hours with more than 25,000 hours airborne in Concorde (more than 7,500 hours at supersonic speeds), has been awarded a full passenger-carrying Type Certificate, the first ever issued for a civil supersonic aero-engine.

More than 110 engines have been produced, and deliveries

for the bench and flight development programmes have been completed. The engines for the first eight production Concorde have also been delivered. The performance of the engines supplied to the production aircraft has been significantly better than the original guarantees, both in terms of thrust and fuel consumption.

The manufacturers point out that much of the rigorous test programme, including the arduous 150 hours Type-Test, was carried out under simulated supersonic conditions. For example, the Type-Test included 120 hours of running behind a heated intake to represent the Mach 2 (twice the speed of sound) cruise conditions of Concorde at altitudes of 50,000 to 60,000 feet, when air enters the engines at 127 degrees Centigrade.

The two companies tackled a host of many design problems new to aviation, often in areas where little previous knowledge existed. It was a matter of "civilising" the military engine. Snecma set about the problems involved in the use of reheat for the first time on a civil aero-engine and undertook to design an exhaust system which, without reducing the performance of the original military Olympus, would give the best possible fuel economy and the lowest level of noise, yet continue to give trouble-free service at the extreme temperatures of reheat operation.

Bristol Siddeley took on the design of a compressor system capable of operating at these high temperatures without the need for frequent inspection, 707, Douglas DC-8 and BAC VC-10 jet airliners. But many fuel burning efficiency. Perhaps as remarkable as any of the achievements was the Bristol design for an electronic control system capable of coordinating the many engine functions which would be important for efficient performance in supersonic conditions.

By 1963, however, it had been decided that the Olympus needed to be redesigned to provide an additional 12 per cent thrust, and this engine, slightly

larger than earlier versions, became available for testing in 1965. It generated 33,000 lbs of dry thrust and 37,000 lbs when reheated. It was first known as the 583B but was later simplified to become the Olympus 593.

Envisaged

Flight testing of the engine continued on a Vulcan test bed until the prototype Concorde flights in early 1969. Although the original 5B was a completely adequate engine for Concorde operation, changes were already envisaged which would improve its fuel consumption and general performance. The designers were especially keen to reduce the take-off noise and smoke, which had begun to cause public concern during the prototype flight trials.

The engines which were used for the first pre-production Concorde (aircraft 01) had a fuel pumping system which was lighter than previous systems and gave greater combustion efficiency, thus improving the fuel economy of the engine and reducing smoke at take-off.

Substantial efforts have also been made on the problem of getting the engine noise levels down. These have been successful to the extent that the noise of the "civil Olympus" for Concorde is much lower than that of the military Olympus from which it was derived. The manufacturers now claim that Concorde's noise levels at take-off and landing are no worse than those of the current generation of subsonic Boeing 707, Douglas DC-8 and BAC VC-10 jet airliners. But many communities around airports are arguing that even this is unacceptable, in the light of the progress that has been made in producing quieter subsonic engines for the new generation of "wide-bodied" airliners, and they want to see the noise of Concorde reduced much further. This is not possible in the present-generation aircraft, largely because of the cost and time-scale involved. Any second-generation Concorde or other type of supersonic air-

craft, however, will probably benefit from the knowledge still being gained, so that any such aircraft is likely to be quieter. Modifications to the fuel combustion system have also resulted in the virtual elimination of exhaust smoke at take-off, with the result that the manufacturers can reasonably claim that Concorde is cleaner in terms of airport pollution than many of the current generation of subsonic jets.

In effect, therefore, over the many years of development, the changes made to the basic military Olympus have virtually resulted in an entirely new engine which is one of the only two supersonic civil airliner engines now in service throughout the world—the other being the Kuznetsov NK-144 engines used in the Soviet Union's Tupolev TU-144, which is in service inside that country for freight and mail carriage, with passenger services expected later this year.

At this stage, it is difficult to say whether or not the Olympus 593 will be able to find uses in other types of aircraft, since it has been tailored so specifically to the Concorde itself. It is probable that, for any second-generation supersonic airliner, another generation of engines will have to be developed, incorporating substantial further advances in technology to take account of the increasing pressures for further noise reduction and improved fuel consumption.

L.B.



Preparing an Olympus 593 for a run on the test bed at the Bristol Engine Division factory (1971).

Perhaps the most exciting moment in the development of Concorde was its early flight testing, when its manufacturers discovered that the aircraft was performing better than had been indicated by research.

Good news from flight tests

THE MOST satisfactory features of Concorde's early flight testing were its good performance in sustained flight at its Mach 2 design cruise speed and its good handling at low speeds. It was also praised for its behaviour in simulated failures of one and two engines at take-off and throughout the entire speed range, including Mach 2.

Although these characteristics had been predicted by computer—as indeed had its complete performance—actual confirmation in flight was an important step. From the outset, it had been foreseen that to ensure the smooth progress of the flight test programme, it would be necessary to use the two Concorde prototypes, one in France and one in Britain.

In this way one aircraft would be able to move forward to a new stage of the programme on the basis of the experience gained by the other. Each of the two prototypes carried about 12 tons of flight test equipment, the equivalent of the full payload of the production standard aircraft. The equipment enabled 3,000 performance parameters to be simultaneously recorded in flight. This great mass of flight data was then analysed by computer, which compared predicted performance with actual performance.

Missions

By early December last year, after flight testing was virtually completed with the granting of the Certificate of Airworthiness, 10 Concorde (two prototypes, two pre-production aircraft and six production aircraft) had flown a total of 5,542 hours of which 2,009 were at supersonic speeds. They had travelled all over the world and flown under almost every imaginable condition, amassing 2,478 flights of which 1,514 were supersonic missions. During the flight test programme, all the Concorde involved collectively flew a total of over 5m. miles, visiting 83 airports in 49 countries.

As a result of the thoroughness of early flight testing and ground test work, most of the production aircraft were able to go supersonic on their first flights, which were often of long duration. Given that Concorde's role demanded absolute safety, a long and guaranteed operational life and maximum utilisation, and that for the first time passengers would be carried at supersonic speeds, a rigorous and comprehensive flight test programme was necessary. Considering the time and resources required for testing a subsonic commercial aircraft, operating in a familiar flight environment, it was obvious that the

task of organising the Concorde flight test programme would be a formidable one.

Apart from the extensive ground test programme, it was necessary to develop new flight test techniques adapted to the special characteristics of a supersonic airliner, because the use of traditional flight test methods would have taken far too long.

Sequence

The techniques adopted enabled the programme to be carried out in a reasonable time-scale and in a logical sequence, covering the entire flight envelope. Developments and improvements in the test techniques, based on experience with the prototypes, were incorporated in the flight test programme as it moved to the pre-production stage and then to the production aircraft.

It is perhaps appropriate to include under the heading of flight test research the Concorde flight test simulator, the most advanced of its kind in the world, with which it was possible to complete flights of all configurations. The simulator has enabled possible modifications to be studied and cleared before incorporation in the aircraft. Well before the maiden flight, Concorde test pilots had acquired several hundred "flying hours" on the simulator. This saved a great deal of flight test time.

One of the valuable secondary effects of the test flights was to show that Concorde was fully compatible with today's standard of international airports, air traffic control procedures and ground support equipment. Its first international flight was made in May, 1971, from Toulouse to Dakar in North-West Africa, to evaluate long-distance flying and to enable performance measurements to be made in the very cold tropical upper atmosphere.

The final phase of test flying was the endurance flying programme, which was completed in mid-September last year and accumulated some 831 flying hours, principally on two aircraft, production Concorde 3 and 4, together with a small amount of crew training work on aircraft 1 and 2. These flights were necessary because certification was dependent upon a sufficient number of flights covering the range of operating conditions foreseen for the aircraft over typical sample routes and with airline participation.

They also had the aim of providing future operators with training of air crews and ground staff, technical crew route qualification, first-hand experience of maintenance, and

reliability and an opportunity to test on-board and ground passenger facilities.

The manufacturers said this programme had shown that Concorde flying at high altitudes, avoiding the strong winds encountered at the lower subsonic levels, the speed of the aircraft remained very much the same, minimising the risk of error during flight planning. In one set of tests 85 per cent of flights were within three minutes of the scheduled time.

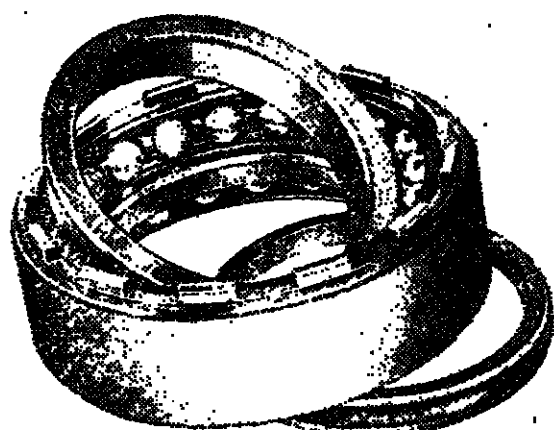
It had also been established that the high accuracy of the

inertial navigation system ensured precise track keeping while allowing adequate margins of distance from land areas in supersonic flight, to avoid sonic boom annoyance, thereby keeping deviations to a minimum.

Endurance flying has shown, according to BAC and Aerospatiale, that while having better in-flight regularity than the subsonics, Concorde's descent rates were within patch reliability compared favourably with that of recent subsonic jets at their entry into service. The net result of the sum of these two regular-

ties is Concorde's ability to achieve accurate arrivals.

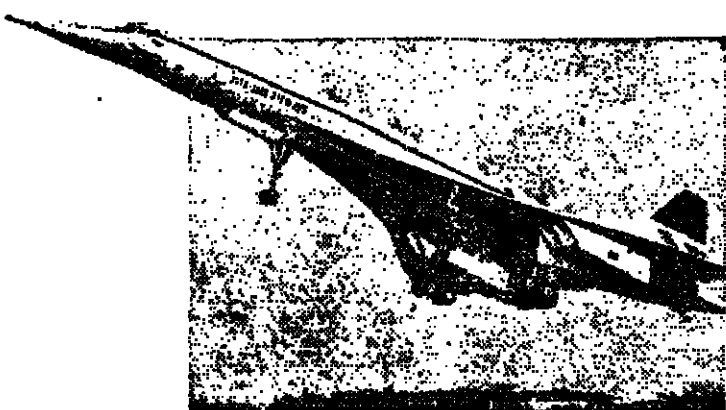
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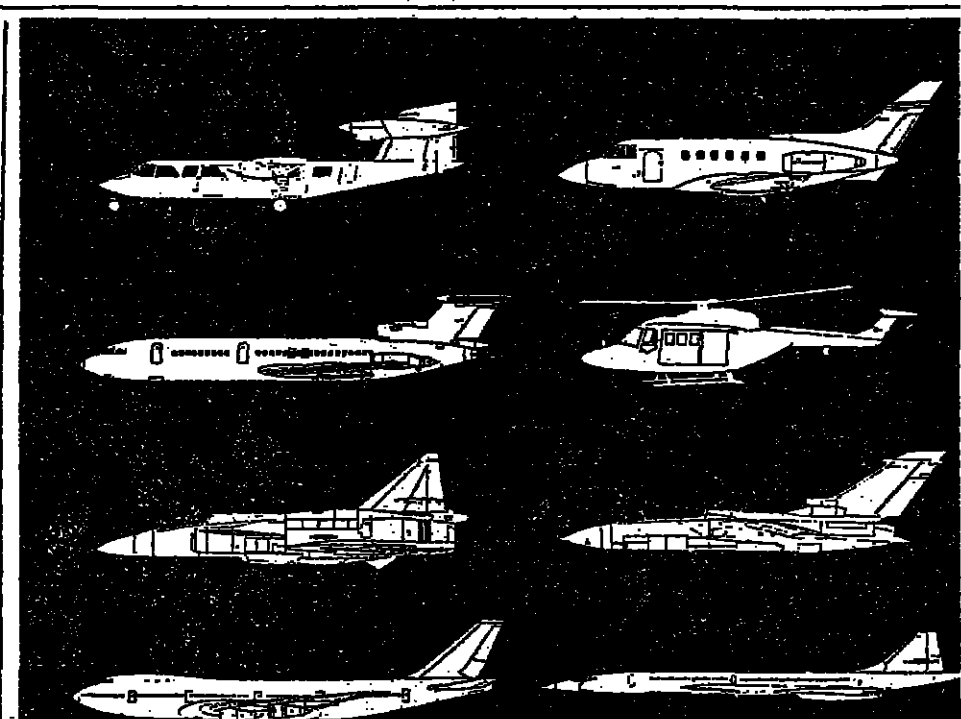
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CONCORDE IX

Concorde is the most thoroughly tested aircraft ever to enter service. An operating life of 45,000 hours specified early in development has meant a huge task for the manufacturers. Both at Toulouse and Farnborough the various pressures to be experienced during a complete Concorde "flight cycle" were simulated. Much new technology has resulted from the tests.

Intensive ground testing

WHEN IT was agreed between the British and French civil aviation authorities that the airworthiness standard required for supersonic airliners should be a "life" of 45,000 hours, including some 25,000 hours of operation at the very high temperatures experienced at speeds faster than that of sound, they could never have fully appreciated the size and severity of the task they were setting the Concorde manufacturers.

The development of the materials to withstand such conditions, the techniques used to transform them into the finished aircraft, and the intense testing which has taken place on the ground at every step of the long production process since the inception of Concorde, illustrate the extent of the technical achievement that comes to fruition to-day with the start of fare-paying passenger services. Broadly, this ground testing

programme has involved three main phases. During the early years of the project, the main aims were the selection of the basic materials, the definition of the structural methods and the techniques of aerodynamic research. Secondly, during 1966, the static testing programme

has been carried out by the French, at the big test centre of CEAT at Toulouse. The fatigue test programme is being carried out at a specially-constructed facility at the Royal Aircraft Establishment, Farnborough. The aim in each case is to simulate on the ground all the various pressures to which a Concorde will be subjected during a complete "flight cycle," from engines on, taxiing, take-off, climb, supersonic cruise, descent, landing, taxiing and engines off.

As a result, it is hoped to prove that the "safe life" of a Concorde in airline service will be in fact substantially greater than any Concorde will ever in practice be expected to fly. The basic design objective, in effect, is an airframe "life" of about 45,000 hours of flying, or more than 24,000 separate flights. On the assumption of an average utilisation of 3,000 hours of flying a year, this would give Concorde an in-service life of about 15 years, although in practice the test programme is intended to extend this as much as possible.

By the time the Concorde was awarded its Certificate of Airworthiness late last year, a total of nearly 7,000 simulated "flights" had been achieved, and it is intended that even after entry into service, this test programme will continue, averaging 7,000 simulated flights a year, or about two to three times as much as any individual Concorde in fact will be expected annually to make.

In this way, the test programme will always be keeping ahead of the actual in-flight operations of the airliner, effectively making Concorde the most thoroughly tested aeroplane ever to enter service.

At the RAE at Farnborough, the fatigue tests have been conducted in the ratio of one subsonic flight for every four supersonic flights—agreed at the start of the programme as being the approximate likely ratio to be experienced in eventual airline service. For the Certificate of Airworthiness, the number of hours of flight simulated in the Farnborough facility was more than 18,300—or about 22 per cent. more than the minimum needed to win the C of A. The detailed inspections undertaken following those tests showed only a minimum of defects, and modifications have been developed to deal with these, and are currently being applied to production aircraft. These modifications will be installed retroactively in production aircraft already flying, prior to their delivery to the airlines. In this way, the results of the test programme are being immediately incorporated into the finished aircraft in airline service.

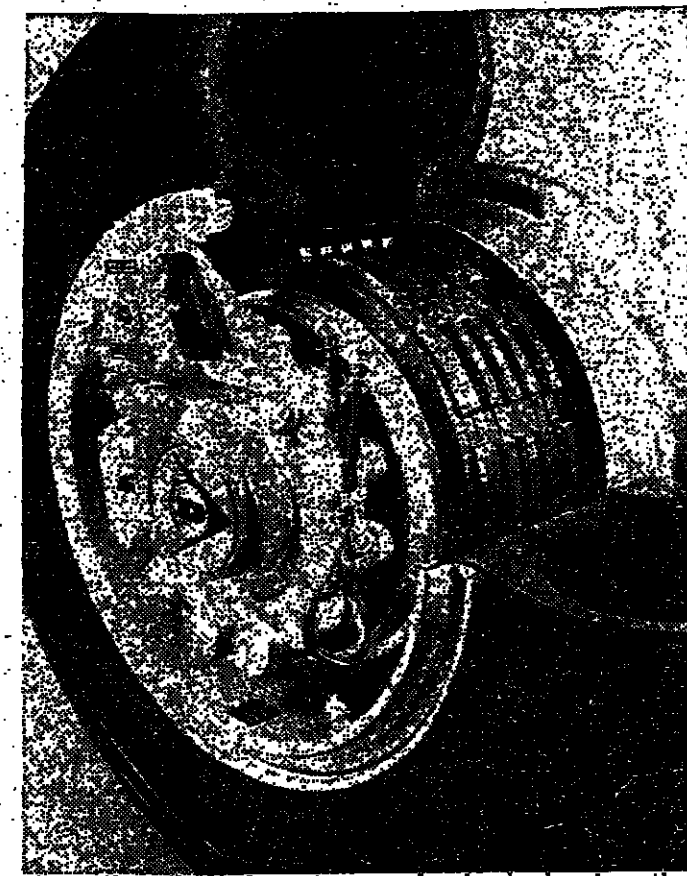
A wide range of other tests have been carried out. These include materials testing, to select and prove the basic materials involved in the aircraft's structure, and in particular to prove their fatigue, "creep" and corrosion resistance properties, and their behaviour in riveted and welded assemblies. These tests have been made not only on metals and alloys, but on all the non-metallic materials and liquids which will be subjected to the thermal stresses associated with supersonic flight.

The aerodynamic research undertaken, in particular to assess the suitability of the Concorde's "slender delta wing" shape, has involved more than 4,000 hours of testing in subsonic, transonic and supersonic wind tunnels. The aircraft's flying-control system, with its associated undercarriage, hydraulic and electrical systems, have been tested on a special rig that has embodied a complete replica of this complex array of controls. Similarly, a complete reproduction of the aircraft's fuel system was built, mounted on a platform that could be moved to simulate the attitudes of the aircraft in flight. Exhaustive impact, fatigue and static strength tests have been made on the undercarriage, tyres and brakes, going beyond the forces that these parts of the aircraft will be expected to endure in airline service. Two full-scale test rigs have been built for electrical testing, one reproducing the electrical generating system, and the other the electrical distribution system.

Acoustic

"Fail-safe" tests have also been carried out to demonstrate the crack characteristics of the aircraft's structure and its residual strength. Acoustic tests have been done to investigate the effects on the structure of engine noise and various pressure fluctuation effects in the air flow.

One of the most important of the thermal effects created by supersonic flight is the "thermal stress," which occurs because the temperature of the internal structure of the aircraft lags behind that of the external surface structure. On the climb, for example, the external structure will be hotter and this will



A section through a tyre and wheel showing the structural carbon brakes which fit into the 22 in. wheel.

set up thermal stresses due to the different amounts of expansion in the materials involved. During cruising flight the internal structure temperature will gradually approach that of the external structure and the reverse effect takes place during the descent to landing and the final taxiing on the ground. These constant wide temperature changes are an important fatigue loading action and in deep structures can give rise to significant stresses. Accordingly, they have to be very carefully calculated if Concorde is to be a thoroughly safe aircraft. As a result actual components of the Concorde—such as parts of the wing and fuselage—have been made and tested specifically to help in the design development of the aircraft.

Together, these specimens make almost a complete Concorde. The tests have included the exploration of temperature and stress distributions under various design conditions; static tests to demonstrate the strength of the structure under extreme temperature conditions; fatigue tests to show their behaviour under the recurring loads encountered in airline service, and fail-safe tests

capable of withstanding damage or failures in service.

Engineers involved with the Concorde flying programme are convinced that the performance of the aircraft has been so good because of the enormous technical assistance they have had in this way during its development. They point out that Concorde is a "systems aircraft," systems being absolutely right.

The test programme itself has produced much new technology and equipment, such as the unit used to test systems on board the aircraft, and this is likely to be applied to other fields—to the financial benefit of the manufacturers. There has also been some interest in process-control systems, which could be applied to the oil or chemical industries. In fact, the enormous test experience built up in the manufacture of Concorde, is part of the overall "technological spin-off" that may well be useful in other directions in future. With knowledge in this area far ahead of most other aerospace competitors, it is felt that this advantage should not be lost.

L.B.



Brian Trubshaw (left) Director of Flight Test for the BAC's Commercial Aircraft Division, and John Cochran, his assistant director, seen at the controls of the Concorde.

BICC, pioneers since the first passenger flights, designed Concorde's airframe cable

Since the first Military and Passenger flights BICC has been involved in the development and supply of cables and accessories for generations of passenger and military aircraft. For the world's first Commercial jet aircraft, the Comet, we developed Nyvin which offered savings in space and weight over the previous generation of elastomeric cables. Further refinements followed and BICC cables were installed in the VC10, the Trident, and BAC Super 1-11. The Concorde, however, posed a unique challenge to airframe cable design.

Cruising at Mach 2, Concorde's supersonic performance creates higher operating temperatures for cables. From the beginning, weight was the critical factor. To extend the aircraft's range, further reductions were required in the all-up weight, and this necessitated the design of airframe cables lighter than the previous types.

The British Aircraft Corporation invited BICC to participate in the development of a totally new airframe cable. BICC and the French company Filotex developed KP210, a special lightweight cable to operate at high temperatures up to 210°C for 50,000 hours—the entire life-span of a Concorde.

The technological developments which contributed to the small size and lightness of the KP airframe cables were twofold:

- Development of a special range of conductor sizes lighter than Imperial strand formations, ISO formations, or American strand formations.
- Use of a special copper alloy for the conductors—cadmium chromium copper which made possible the use of the smaller conductors.

The KP210 conductors are insulated with fluorinated ethylene propylene coated Kapton tapes, and specially formulated polyimide lacquer is applied to the exterior.

Aircraft & Instrumentation Cables

Apart from the airframe wiring cable, which accounts for most of the cabling within an aircraft, BICC supplied a major proportion of the other cabling for the four prototypes and the subsequent sixteen production Concordes.

Technological Spin-Offs

An earlier development of KP210, the KP150 airframe cable with silver-plated copper conductors has been used in the MRCA, the Shorts SD 330, and the wide-bodied European Airbus A300B built by Airbus Industrie.

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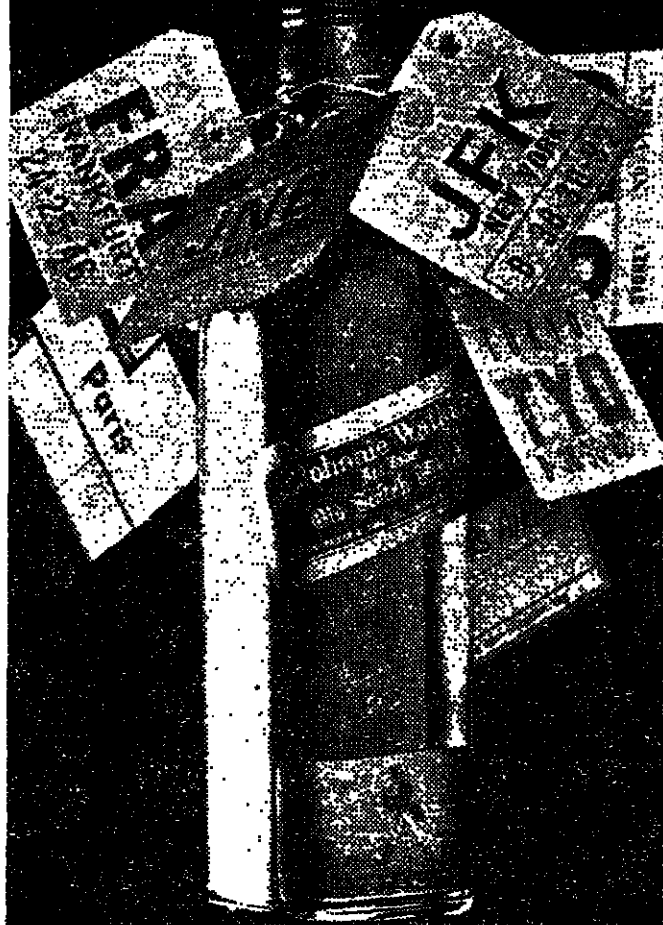
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CONCORDE X

One of the most persistent criticisms of
the Concorde project is that it has been a profligate
waste of the country's resources, which some have claimed could
have been spent in a more socially desirable way.

Costs in perspective

THE ARGUMENT over the costs of the Concorde project is likely to rumble on for a long time, but some basic figures, taken from the Government's Monthly Digest of Statistics, might be helpful in putting Concorde spending in the right perspective.

First, the cost of the research and development programme since the project's inception in November, 1962, to the end of the R and D activities some time in 1977-78 when the static and fatigue testing on the ground finally came to an end, is put at £1,096m. calculated at the exchange rates prevailing when the costs were incurred or estimated in the case of spending after the end of 1975. Of this sum, about £950m. had been spent by the end of 1975, roughly £475m. by each country. This was equal to about £36m. a year, or so, spent by each country over the 13 years' life of the venture so far.

By comparison, over those same 13 years Britain alone had spent a total of over £15,000m. on beer, over £11,500m. on wines and spirits, and over £20,000m. on tobacco. It is probable that spending on alcohol and tobacco in France are not significantly different from these figures. While no one would dispute that many millions enjoy drinking, smoking, and even gambling, and that there are substantial industries based upon those items, the comparable spending of £36m. a year on Concorde R and D does not seem to be quite so disgracefully profligate after all, especially when it is also borne in mind that Concorde has created direct employment for approaching 25,000 people in this country and a similar number in France on the engine, airframe and systems involved, quite apart from the new technologies that have been spawned from it in

ceramics, glass, fuel management, the theory of structures, and so on.

It is accepted that most of this R and D money will not now be recovered, although a levy is included in the sales price of each of the 16 Concorde so far authorised by the Government. But even if it has to be accepted that the recovery will be minimal, there remains a tangible asset in the aircraft itself, and in the know-how that has been acquired for the future use of this country and France in aeronautics.

It is also true that this £1,096m. represents a considerable escalation on the bill as originally estimated at between £150m. and £170m., divided between the two countries, in November, 1962. But analysis of the R and D budget shows that at least 45 per cent. of the escalation is directly due to inflation in both countries, and particularly in the U.K. itself in recent years; to a series of devaluations, again with the depreciation of sterling a particular factor; and to changes in design. Of all these, the last is the smallest contributor to the overall escalation in costs.

Between November, 1962, and the end of 1974, the total spending on Concorde R and D in actual costs at the prices and exchange rates prevailing when the costs were incurred, was £839m., of which the U.K.'s share was £436m. and the French share £403m. Between January 1, 1975, to the completion of the programme (probably around 1979, when fatigue testing ends having simulated nearly 90,000 flight hours), but measured in January, 1975 prices, and at an exchange rate of £1=Fr.10.25, the balance of the R and D outlays is set at £243m., of which the U.K.'s share is £112m. and the French share £131m.

Much of those sums in fact were spent through 1975, so that by the end of last year, total R and D outlays had reached about £950m., leaving about £146m. still to be spent. This money will be devoted to the post-certification work on the aeroplane that has still to be done in both countries, the largest item being particularly the fatigue testing work that will run for some time to come, and some further work on engine noise reduction and any additional post-certification flying that has to be done for special purposes.

Guaranteed

These figures do not take into account the production funding for the Concorde, which it is intended to be fully recoverable from the sales of the aircraft to the airlines. This money, which is expected to amount to at least £400m., or about £200m. for each country—representing approximately £35m. for each of the 16 aircraft involved excluding spares (or £30m. including spares)—is being provided to the manufacturers by the Government in the form of interest-bearing loans, or by loans from the manufacturers' bankers guaranteed by the Government.

Under the Concorde Aircraft Bill of November, 1972, up to a possible maximum of £350m. may be lent by the U.K. Government for Concorde production purposes. So far, by the end of 1975, it is understood that about £150m. had been spent on production in the U.K. and a similar sum in France, covering the six production aircraft already flying, and the work on the remaining ten, which are in an advanced stage of structural assembly.

In fact, production spending itself is probably now well over the half-way mark. Of the ten aircraft still being built, at least two are recognisable aeroplanes, and many of the others are rapidly taking shape, and many parts for the entire production batch authorised so far have been completed, with some sub-contractors now leaving the programme. As a result, the production momentum is slowing, and both Aérospatiale and British Aircraft Corporation are having to lay off labour across the spectrum of Concorde work, from design through to assembly line personnel. As a result, production spending seems likely to drop during 1976, and decline further in 1977, unless new orders emerge.

From all this, it can be seen that overall Concorde spending is now well past its peak, and on the decline. Everything now depends upon how well the aeroplane performs in service, for it is this factor—in both economic and social acceptability terms—that will deter-

mine whether or not other airlines will be encouraged to buy.

This gives rise to the question—just how well will the aeroplane do in service? So far, of course, there are no detailed statistics of fare-paying passenger operations upon which to base any judgments. Furthermore, any estimate of airline operating economics in 1976-77 and onwards has to be based on much conjecture—such as fuel prices, the state of the world airline market, and fares increases. It is a fact that by varying key basic assumptions, such as those on annual utilisation, amortisation, seating layouts, fuel costs, fares and market penetration, the future economics of any transport aircraft can be varied almost at will from substantial profit to substantial loss.

The BAC itself has said that, taking middle-of-the-road assumptions for 1977, Concorde will break-even at around 80 passengers per trip—or on a 50 per cent. load factor on a 100-seat layout. The BAC view is that the average load factor is more likely to be in the 80 per cent. area—and it has based its estimate on a ten-year already trying to save money

amortisation period, a 3,000 hours a year utilisation rate, a fuel cost increase to 50 cents a U.S. gallon, and fares levels varying from first-class to first-class plus 20 per cent. according to the route. The fares for both routes to be flown first—London-Bahrain and London-Rio de Janeiro, will bear first-class plus 20 per cent. rates.

But even fares levels of such proportions may not deter the passengers. Recent surveys conducted by Concorde's manufacturers have suggested that between 75 and 90 per cent. will opt for Concorde, largely because they are businessmen and whose fares are paid for by their companies, and who could argue that even the additional 20 per cent. on the fare could be saved by flying out and back in a day, cutting out expensive overnight stops and other costs incurred during even a brief stay in, say, New York.

There is no doubt, however, that the time-saving offered by Concorde will be a big inducement to would-be long-haul travellers. The reduction in flying time is also a big factor. There is also an increased convenience in many cases resulting from a combination of speed and time zone differences. For example, leaving Paris at about 11.30 a.m. on the Air France service, a passenger will be in Rio de Janeiro by 2.30 p.m. local time the same day—an immense revolution in air transport. As M. Pierre Cot, the former chairman of Air France, commented: "To benefit from this revolution there is a

Inducement

clientele which is w economy-class, it is not likely to be wooed into sending them surveys, that at least an additional 20 per cent. on the already greater first-class rate. The only factor that might sway such passengers again would be savings in other directions—such as out and back in a day.

These are the critics that are about to be tested with the start paying passenger. Because of the high buying and introducing costs, it is expected that the air show an overall profit books of either British or Air France in the of service, even though individual aircraft trips well above break-even for provided they show of profitability that sustained at a high level a long period of time craft can slowly original investment, actually produce profit airlines—and it is this will stimulate the on

Companies involved

Over 300 companies of all sizes throughout British industry have been involved in the Concorde research, development and production programme, supplying to both assembly lines and both countries a vast range of items, from raw materials such as titanium through to small components such as hinges and screws. A similar number of companies have been involved in France.

As a result, it is estimated that, at the peak, and including the workforces directly involved in the airframe and engine companies—British Aircraft Corporation, Aérospatiale, Rolls-Royce (1971) and Snecma—around 75,000 workers on both sides of the Channel have been engaged in some aspect of the Concorde programme.

The following list, prepared by the British Aircraft Corporation, contains those companies in the U.K. whose activities for the overall production Concorde programme amount in value to more than £5,000 per aircraft. The list, therefore is not exhaustive, for many other companies have supplied items of a lower total value per aircraft, while others have been at one stage or another involved in some aspect of the research and development programmes:

Aerolex, Camberley	Seat belts, buckles
Aircraft Marine Products, Stanmore	Elec. Terminals
Alcan, Birmingham	Aluminium
Allform Tools, Sheffield	Tooling
Ampep Ind. Products, Clevedon	Bearings
Auto Diesels Braby, Uxbridge	Ground Equipment
Avdel, Welwyn Garden City	Materials
Aviation Tool Corp., Hounslow	Tooling and machining
Avica Equipment, Hemel Hempstead	Flexible mountings, clamps and seals
Brensal Electronics, Bristol	Ground Equipment
British Aluminium, London	Aluminium
Brit. Insulated Cables, Leigh, Lancs.	Cables
T. J. Brooks, Leicester	Material
Cannon Electrics, Basingstoke	Electrical Connectors
Crossley Carpets, London	Carpets
Delancy Gallay, Biggleswade	Heat and fire shields, seals, tooling
Daniel Doncaster (Blaenavon)	Forgings
Dowty Group, Cheltenham	Switches, hydraulics, seals, materials and other items
Dunlop Group	Rubber components, tyres and brakes
Egerton Tool & Instrument, Edgware	Tooling
Electronic Associates, Burgess Hill	Electrical Equipment
Ferranti Group	Electronic equipment
Firth Vickers (Stainless Steel), Sheffield	Stainless steel
Flight Refuelling, Wimborne	Fuel components
Flying Service (Eng. & Equip.), Fothergill & Harvey Group, Bridgwater and Littleborough	Seats
Gloster Engineering (Cheltenham)	Tooling
Goliath Engineering, Sunbury	Pre-fab machining
Graviner	Fire protection systems & other equipment
Grundy & Partners, Stonehouse	Ground Equipment
Hall & Pickles, Sheffield	Tooling
Hellermann Deutsch, E. Grinstead	Electrical Connectors
Hercules Engineering, Isleworth	Pre-fab machining
Hewlett Packard, Slough	Elect. equipment
High Duty Alloys, Slough	Forgings
Imperial Metal Industries (Kynoch), Birmingham	Titanium
International Computers, London	Computers
Instrument Research Labs., Corsham	Ground equipment
D. Kane, Welwyn Garden City	Sealants
Kaynak (U.K.), Wembley	Materials
Kenure Developments, Camberley	Ground equipment
Walter Kidde, Greenford	Oxygen systems
Kodak, Hemel Hempstead	Film, recording paper
Lever (Tolworth), Wimbledon	General machining
Liarcad (Aircraft Products Div.), Redditch	Materials
Lucas Aerospace Group	Generation equipment, connectors and other equipment

Marconi-Elliott Avionic Systems, Rochester	Automatic flight
Marshall of Cambridge	Tooling & elect
Midcast Numerical Control Group, Glen Parra	Tooling and oth
Minnesota Mining & Manufacturing, London	Adhesive film, punched cards
Moore's (Wallisdown), Bournemouth	Tooling and ma
Morfax, Mitcham	Flying control machinery
Narmalair Garrett, Yeovil	Air valves and
Northbridge Engineering, Leicester	Materials
Ottershaw Engineering, Weybridge	Machining
Planer Products, Sunbury	Ground equipm
Plessey Group	Fuel system pu data acquisition and other
Rank Xerox, Uxbridge	Paper, duplicat
Raychem, Swindon	Cables and othe
RFD-GQ, Gdalming	Escape equipme
Rosemont Engineering, Bognor	Ground equipme and electrical
Sandvik U.K., Halesowen	Titanium tubes
Sculpture Machining, Bedford	Tooling and oth
S.E. Laboratories (Eng.) Feilham	Elect. instrumen
Servicon Dynamics, Cheltenham	Ground equipm
Shell Mex & BP	Aviation produc
Sintrom Electronics, Reading	Ground equipm
Smith Clayton Forge, Lincoln	Forgings
Smiths Industries	Instruments and
Superflexit	Conduits
Syston Donner, Leamington Spa	Fire-detection c
C. F. Taylor (Metal Workers), Wokingham	Tooling & electri
Teddington Aircraft Controls, Yeovil	Valves
Thermal Controls, Hove	Switches
Titanium Intl., Solihull	Materials
Triplex Safety Glass, Birmingham	Windcreens & o
United Moulders	Plastic moulding
UNI-Tubes, Bath	Tubes
Vickers Group	Electrical and
Wadon Engineering, Croydon	Tooling
Wandieside Warren, Dunmurray, Northern Ireland	Cable
Henry Wiggins, Hereford	Nimonic alloys

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CONCORDE XII

It would need a very deep crystal ball to provide even a vague outline of the shape of things to come in the sphere of supersonic aircraft. Nevertheless, the possibility of a "Mark II" Concorde provokes interesting thought.

A long look ahead

THE FIRST POINT that needs to be made in any discussion of the question whether there will be a second generation ("Mark II") supersonic transport (SST) of any kind is that it is likely to be a long time in coming.

There are several reasons for this. The first is that there are still many airlines, governments and even passengers who remain sceptical of the value of supersonic civil aviation, and who will require much convincing before they commit themselves to buying and flying the first-generation Concorde. Let alone even start thinking in terms of any aircraft beyond that. It seems likely, therefore, that it will be some years—during which time Concorde will have to prove itself economically, environmentally, and politically—before any decisions to embark upon its successor are initiated.

Performance

Second, there can be little doubt that any second-generation aircraft would have to offer some significant improvements in performance over the first-generation Concorde to make it worth while considering at all. This is not something that is experienced in the development of all second-generation civil aircraft. The questions that would have to be solved so far as this second-generation aircraft are concerned are, first, whether it should be a faster aeroplane, travelling at, say, three or four times the speed of sound instead of twice the speed of sound as with Concorde; and second, whether it should be larger carrying, say, 200-250 passengers instead of Concorde's 100 or so. Only when those questions had been settled would it be likely that manufacturers and governments would seriously consider the economics of any second-generation supersonic airliner.

Thirdly, any such aeroplane would also have to offer some significant environmental improvements over Concorde. The

difficulties encountered already by Concorde in winning approvals to use many foreign airports and to fly across foreign territories have shown beyond any doubt that, despite the claims of the manufacturers, many people are still unhappy about the environmental and "social acceptability" aspects of the aeroplane. While it is possible that many of these fears will be allayed once Concorde has entered far-paying passenger service and has been able to demonstrate that it is not quite the monster that many have made it out to be, there is nevertheless likely to be considerable pressure to ensure that any derivatives are not only better in terms of lower take-off noise, but also in terms of a lower pollution emission level from its engines.

All these factors are likely to involve a continued research and development programme on both sides of the Atlantic, but apart from this the one factor that will influence the possible development of a second-generation supersonic transport more than any other will be the profitability or otherwise of Concorde itself over the next few years. Only when it can be seen beyond doubt that supersonic civil aviation is profitable, as well as socially acceptable, is it likely that manufacturers, governments and airlines will begin to consider the possibilities of any second-generation vehicle.

This is not intended to imply in any way that Concorde itself will be a flop. What it does mean, however, is that the two Governments involved, Britain and France, have already spent so much money that they will want to be sure that there is some chance of ultimate success before risking any more, while the more cautious Americans, who abandoned their own initial supersonic transport venture some years ago—after considerable cost and without ever reaching the stage of a flyable prototype—will be just as anxious about ultimate profitability before embarking upon this kind of venture again.

All these factors point to it

not only being several years before any second-generation SST emerges, but also to the fact that any such aeroplane being even more of an internationally collaborative venture than Concorde. The aim is most likely to be for the British and French Governments to seek participation directly by the U.S. Government and the U.S. aerospace industry in such a programme. The reason for this is solely economic. The rising cost and complexity of all new civil aircraft, subsonic and supersonic, is such that already individual companies and even countries cannot undertake them alone and have been obliged to link up in collaborative ventures. This is as much true of the giant U.S. aerospace industry as it is of Europe. Major subsonic jet manufacturers such as Boeing, for example, are already seeking international partners for such new ventures as the 7X7 family of short, medium- and long-range transports for the 1980s. Moreover, the U.S. aerospace industry has made it clear that it does not intend to embark upon any supersonic venture without a significant financial contribution from the U.S. Government—which in turn seems likely to influence the U.S. Government to seek partners overseas in an effort to spread the burden of costs.

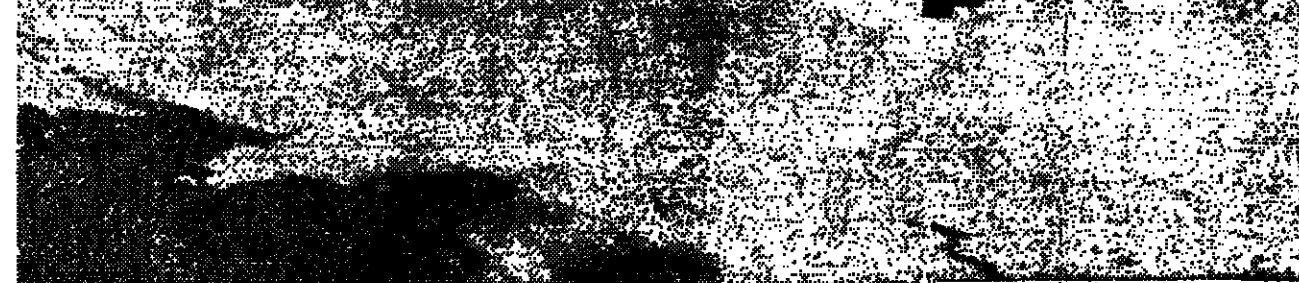
Furthermore, it is quite clear that there will be limitations on the future market for any second-generation supersonic airliner—probably restricting sales to not more than 100-200 aeroplanes or so because of their cost, their vast size and available work capacity—so that any competition between builders would become wasteful to the point of being ridiculous. It would be in everybody's interests to ensure that there was tripartite collaboration between the U.S., France and Britain on such a venture. This might also eventually involve other countries, such as Japan, which is now developing substantial aerospace aspirations of its own. It might also be politic to include the Soviet Union in such calculations from an early stage. Whether the latter would

be prepared to participate in the development of such a second-generation international supersonic venture remains to be seen—much would probably depend upon the success it achieves with its own first-generation TU-144, both domestically and in the export market. But at least there would be no harm in inviting the Soviet Union to be a party to any initial discussions on the possibilities.

At this stage, nobody really knows what any second-generation supersonic transport would cost. The fact that the Concorde itself is costing over £1,000m, in its entire research and development phases, and several hundreds of millions more for production (this being recoverable from sales, although most of the research and development cost is having to be written off), indicates that any bigger, faster, technologically-advanced supersonic transport would cost much more—say, around £1,500m-£2,000m, even allowing for the accumulation of technical knowledge on supersonic civil aviation already gathered.

An entirely new supersonic engine would have to be developed, for example, that would not only be significantly quieter and pollution-free compared with Concorde's Olympus 593 engines but also considerably more fuel-efficient in an era of higher fuel costs and possible fuel shortages. This development alone, on the basis of present speeds of three or four times that of sound. Much work on this has, of course, been done in the big U.S. missile and space programme, but it would still have to be adapted for civil aviation use, and this would cost money, and time.

What all this amounts to is simply caution in assessing the prospects for any second-generation supersonic airliner.



McDonnell Douglas of the U.S., in common with other U.S. manufacturers, has retained an interest in supersonic transports on a private venture basis, despite the cancellation of the U.S. Government-supported Boeing 2707-300 in 1971. The picture shows an artist's impression of a possible "Advanced Supersonic Transport" (AST), capable of carrying up to 273 passengers over 4,400 miles at Mach

3, for example, that would not only be significantly quieter and pollution-free compared with Concorde's Olympus 593 engines but also considerably more fuel-efficient in an era of higher fuel costs and possible fuel shortages. This development alone, on the basis of present speeds of three or four times that of sound. Much work on this has, of course, been done in the big U.S. missile and space programme, but it would still have to be adapted for civil aviation use, and this would cost money, and time.

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No one in the aerospace industry on either side of the Atlantic seriously doubts that, in technical terms, a second-generation supersonic transport is within the capabilities of slowly, over a period of years, once the almost certainly basic political questions of the end of this decade desirability, social acceptability in the 1980s, depend on cost have been settled. Some market performance of might be prepared to go even further and claim that a second-generation SST is inevitable, with it an upsurge based upon the historical fact demand for air transport that once mankind has invented this stage, these factors a faster way of getting from one place to another, it generates a market momentum of its own, the resulting eventually in the development of vehicles to meet

Industry in general and the aerospace industry in particular can be expected to benefit from Concorde spin-off technology. This is likely to range from the development of new materials to tooling, equipment, test practice and even to administration and commercial operation.

Spin-off technology

IN ANY project where new technologies are developed to deal with a particular problem, there is likely to be the side benefit of discoveries and developments which are useful in other areas. The development of Concorde has produced a varied and as yet largely unexploited amount of this spin-off.

The first question any company is likely to ask is what particular benefit it can expect from the work which has been carried out on Concorde. The most likely answer is that it can prevent it from undertaking expensive research work in areas already explored. In other words, it can prevent it from "re-inventing the wheel."

Superior

On another level, Concorde has generated benefits which are less easily quantifiable. For example, it may have created the knowledge to build a vastly superior type of equipment but which because of its cost may be slow in achieving commercial sales—although markets are considered certain to emerge in the longer-term.

By way of illustration, Dunlop has been a supplier of aircraft brakes for many years but, with the increasing weight and landing speed of modern aircraft, has had to carry out research into how they can be stopped more efficiently. This has resulted in the creation of sophisticated braking techniques and processes involving research and the application of advanced materials.

The most significant development has been the introduction of carbon and carbon-composite material for lightweight aircraft type of machine tool, with more than 600 being sold in France from the start of the project to

1,440 lbs in weight, the equivalent of eight passengers. When Concorde enters service it will be the first civil aircraft in the world to be fitted with structural carbon brakes.

Other aircraft are now benefiting from the development work carried out on the Concorde—structural carbon brakes have been undergoing trials on a RAF Harrier operating under normal service conditions. Other industrial applications are now also being examined. At this stage it appears that the main technological spin-off from the work done on the Concorde programme over the past 13 years will be in the sectors concerned with materials, tooling and methods and equipment. In the field of materials there has been spin-off in the development, production and machining of light alloys, special purpose steels, refractory materials, and non-metallic materials such as glass, adhesives and paint. Perhaps the most important of these has been the development of a new light alloy and the methods and tools for its fabrication.

The use of a particular elastomer, a synthetic rubber, to improve sheaths on electric wiring, has led to its widespread use in the electrical industry. But an unexpected spin-off from this has been the development of this material for the manufacture of large, self-lubricating universal joints made of impregnated glass-fibre fabric. They are rustproof and last ten times longer, with many areas of application.

In the field of machine tools, the manufacture of Concorde has certainly speeded the introduction of the numerical-control type of machine tool, with more than 600 being sold in France from the start of the project to

early 1970. Production programmes which include the use of optics and laser beams, have also been significantly advanced. Similarly, the search for means of miniaturising electronic circuits has been spurred on by the exacting size and weight specifications laid down by Concorde. Some of the designs produced for braking control systems have enabled European manufacturers to break into the U.S. market. But experience from the U.S. space programmes has shown that the ultimate benefits from an advanced technology project such as Concorde often take many years to become visible as beneficial to man. As in the past, some techniques have been developed for which there is no immediately apparent commercial use.

As the Concorde programme begins to wind down, it is clear that the British Aircraft Corporation will be anxious to find a use for highly sophisticated test facilities which have been developed for the aircraft. It is pointed out that these are readily applicable to a wide range of industries.

BAC adds that it is able to advise on the application of electron beam welding, plasma arc welding and superplastic forming and to carry out tests for fatigue, thermal stress, duration or proof load. In many cases these facilities are not available elsewhere in Europe.

Unusual

One of the more unusual facilities developed for Concorde tests is a "gun" designed to simulate bird or engine debris impact. It is capable of speeds up to 1,000 feet a second, using articles of up to 5 lbs in weight. Speed recording is carried out by a high-speed camera photographing the missile passing a marker board and using a timing mark superimposed on the film.

But most equipment available covers areas such as thermal testing, fatigue testing and various other test services. Perhaps the most significant test spin-off has been the development of a system known as Universal Test Equipment (UTE). This is aimed primarily at rapidly and accurately diagnosing aircraft faults and, in the process, reducing turn-around times between flights.

It is claimed that a ratio of ten-to-one improvement over manual methods is conservative, and it is suggested that, with the increased complexity of many assemblies to be tested, it is often impossible to use manual means. In addition, the UTE is able to repeat, without deviation in accuracy or sequence, the same tests indefinitely and at high speed, resulting in considerable savings in the costs of testing and of spare holdings.

For a small aircraft fleet, a

single set of manual test equipment may be able to cope with the test requirements, provided sufficient spares are held to allow for a long test duration on complex avionics equipment. But due to systems development, and the resulting equipment modification which is normal throughout the operational life of an aircraft, the lack of flexibility in manual equipment often leads to the need for replacement, owing to the expense of modification.

It is intended that an automatic version of UTE, to be called MUTE, will be available this year. This will mean that the whole flying control system of an aircraft can be tested automatically, a big advantage for an operator of a fleet of complex modern aircraft. It is also likely that the system will be

sold for application areas of industry. Finally, one somewhat subtle but nevertheless important area of spin-off harmonisation of test administration standards and methods, which will be useful to the companies concerned and to the aerospace industry as a whole.

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البحر الأحمر

CONCORDE XIII

Several companies involved in the Concorde project have carried out basic research and development which have made them pre-eminent in their fields. In particular are the makers of the fuel management system and the Automatic Flight Control System — the most sophisticated ever in their field.

Advanced technology

AMONG the many individual aer and sub-contractor, and the technological achievements that helped to make Concorde a revolutionary aeroplane it of companies have been involved, including Shell and BP, Plessey and Flight Refuelling. The AFCS makes Concorde safe and stable, while flying at the speed of a rifle bullet, and yet brings it into an automatic landing safely and gently. All modern airliners need some form of automatic flight control system, providing both an automatic augmentation of the aircraft's natural stability while in flight, and the ability to fly "hands off" the controls, freeing the pilots for their more important tasks of navigation, communication with the ground and overall flight management. The AFCS, therefore, is thus fundamental to flight by all big modern airliners, and it is thus usually one of the biggest sub-contracts placed by an aircraft manufacturer after the engines.

In the AFCS for Concorde, the two main components are more sophisticated than any other aircraft, with 33 "modes" or functions which the pilot can select — including attitude in flight — for example, this can overcome the effects of any mechanical jamming of the controls, a degree of protection possessed by no other airliner.

viding automatic landing itself. The AFCS also involves other sub-systems, some of which are also used on subsonic jets, such as an automatic throttle to control the speed throughout the whole flight; electric trim to keep the aircraft properly trimmed at all times; a warning and landing display that indicates to the pilot when an automatic landing can be undertaken; and safety flight control, giving automatic protection against reaching a dangerous attitude in flight — for example, this can overcome the effects of any mechanical jamming of the controls, a degree of protection possessed by no other airliner.

Combat Aircraft (MRCA). For these reasons, quite apart from its direct benefit to Concorde itself, the AFCS is important for civil aviation and for the British and French taxpayers who have paid for the development of the entire Concorde programme.

So far as fuel is concerned, in addition to acting as a propellant, Concorde's fuel supply system forms two vital roles in the control and handling of the aircraft. During supersonic flight, when high temperatures are experienced, the fuel in the tanks acts as a "heat sink" which helps to dissipate the heat created on the outside surfaces of the wings, in the hydraulic system, cabin air system and lubricating systems.

Secondly, the fuel is also used to help in stabilising the aircraft's flying attitude during the transition from subsonic to supersonic speeds. In this process, the fuel is automatically pumped forward or aft to help in obtaining the required centre of gravity in flight. The entire wing areas of the aircraft, in effect, are vast fuel tanks, and through a complex pumping system, fuel is transferred from the front trim tank and main fuel tanks to the rear trim tank during acceleration through transonic speed to supersonic cruising speed. At the end of cruise, fuel is pumped forward from the rear trim tank into the main and front trim tanks. When retrimming the aircraft for landing after prolonged flight at the AFCS for the Multi-Role, subsonic speeds, fuel is also

What the pilot sees. Although Concorde is the most complex civil airliner now flying, efforts have been made to keep the flight deck as simple and comfortable as possible for the crew, but to the layman it is still a bewildering array of instruments.

transferred aft. Another important aspect of this fuel management system, which is unique to Concorde, is to ensure that no excessive loads are applied to any part of the structure throughout the various phases of the flight as the fuel is progressively used up. Plessey has played a vital role in this fuel management system, providing the pumps upon which it relies, while other companies which have been involved include Flight Refuelling, providing valves and other equipment.

The use of fuel in this way has also given rise during the Concorde development programme to a detailed programme of research by the major fuel companies, Shell and BP. Shell Research, in conjunction with the Concorde manufacturers and the Department of Industry, developed a rig at the Shell Thornton Research Centre, reproducing as closely as possible the Concorde's fuel system conditions. As a result high quality fuels and lubricants are now available world-wide that are suitable for Concorde.

The BAC itself, at its Filton factory, built a complete replica of the complex Concorde fuel management system, which has been used to test and prove the detailed functioning of the transfer techniques that are employed in the aircraft. The fact that the Concorde has already been flying without mishap for nearly seven years, with over 5m. miles to its credit world-wide, indicates how successful all these expensive and extensive researches have been in meeting the development of the aircraft's complex requirements in fuel technology.

Standards

As a result of all the work done by Marconi-Elliott and SPENA on the AFCS, design standards used for Concorde have become the accepted standard for the latest subsonic jets, including TriStar, DC-10 and the Boeing 747. Although these aircraft entered service before Concorde, the major decisions were made for Concorde before those aircraft were projected. As a result, the high standards set in Europe have inspired considerable confidence throughout the world in the ability of the companies concerned to provide AFCS, and Marconi-Elliott has made several breakthroughs in exporting the system. Examples include the purchase by Boeing of an advanced auto-throttle system for the later 747 Jumbo jets — an order strongly influenced by Marconi-Elliott's involvement with Concorde. Boeing has also bought the AFCS from Marconi-Elliott for the YC-14, its contender in the current U.S. Air Force competition for a replacement for the Hercules transport aircraft, while Panavia has retrimming the aircraft for, fact that, while the temperature of the outside atmosphere at 60,000 feet is around minus 60

degrees Centigrade, the temperature of the Concorde's external structure as a result of kinetic heating can rise to as much as plus 150 degrees Centigrade at the tip of the nose, and up to 130 degrees C at various points over the skin.

Because of the large volume of fuel carried in the Concorde it offers the ideal medium for cooling and absorbing the surplus heat that the rest of the aircraft cannot absorb because there is no other cooling system available. The use of alternative methods, such as refrigeration, are ruled out because of the added weight, cost and complexity they would involve. The method of cooling employed is to pass the fuel during its passage from the tanks to the engines through a series of "heat exchangers." In this way, the surplus heat absorbed by the fuel from the aircraft and its systems is in effect not stored, but passed out through the engines. The kind of work that the fuel has to do in this context can be gauged from the fact that, while the temperature of the outside atmosphere at 60,000 feet is around minus 60

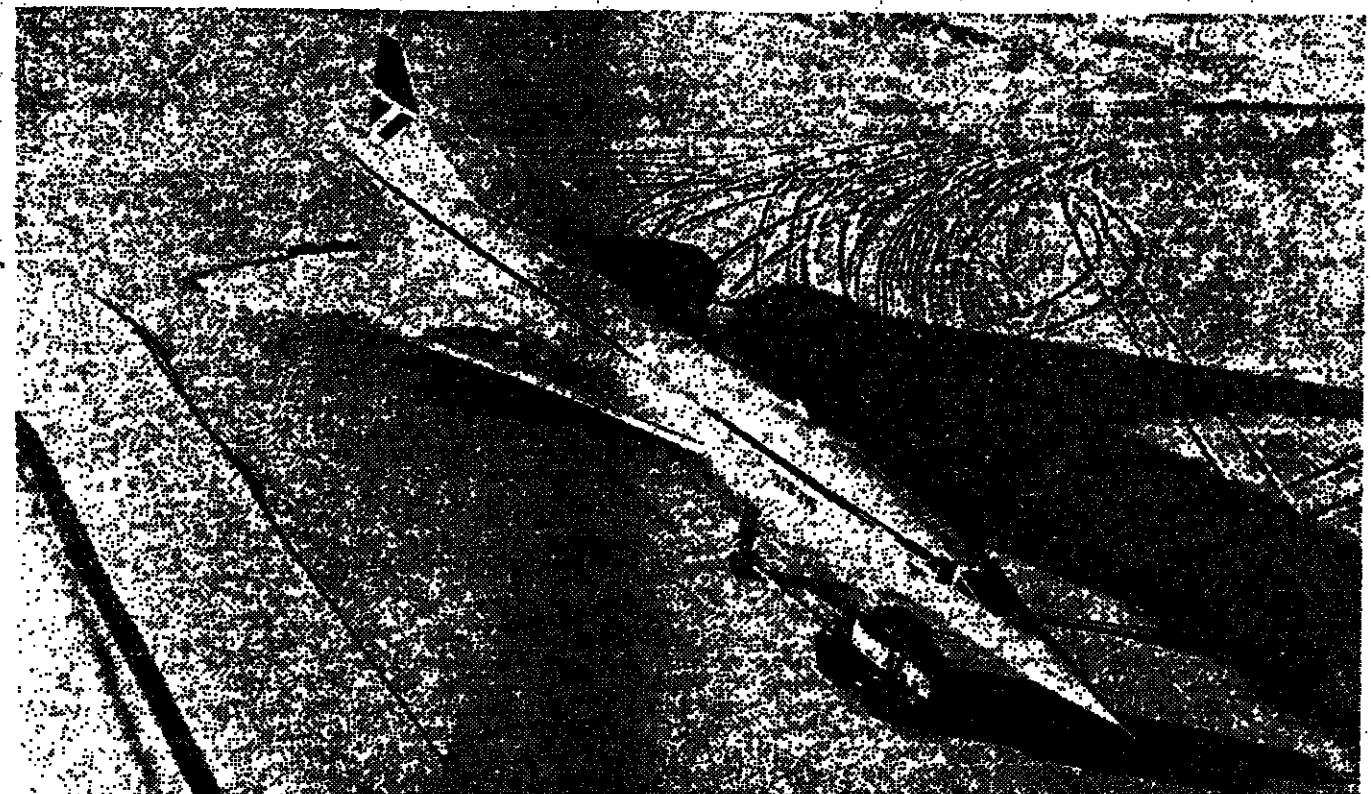
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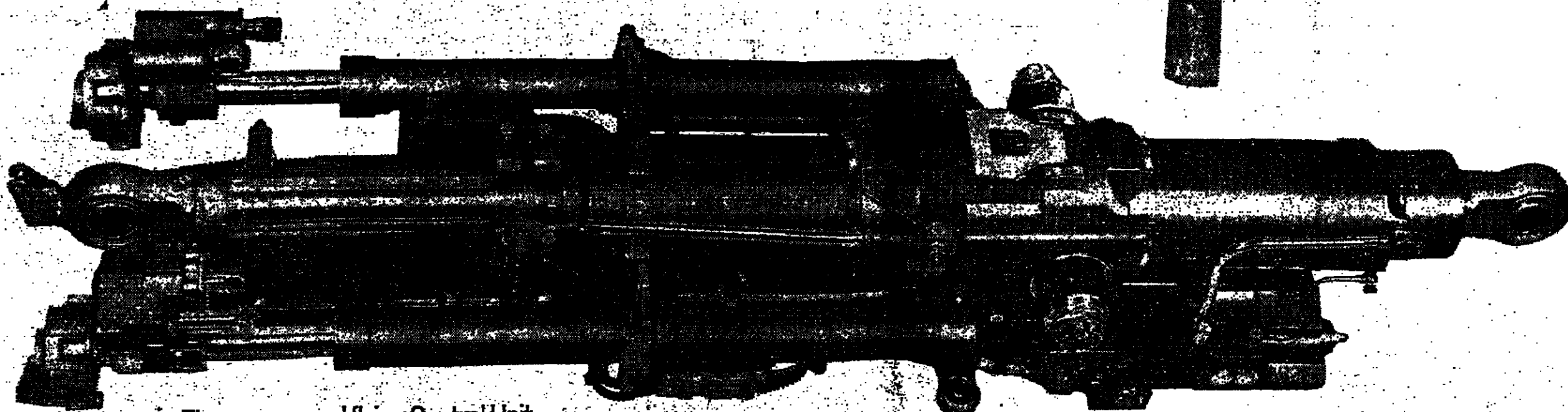


Part of the Concorde's extensive flight test programme included cold-weather trials in Alaska. The aircraft involved is the pre-production Concorde 02 which underwent a complete range of ground and flight trials in the worst possible weather conditions.

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CONCORDE XIV

As an exercise in international collaboration the building of the Concorde airframe by the French and British teams is a success story which has given great impetus to similar ventures throughout the world's aerospace industries.

The airframe teams

THE ANGLO-FRENCH Concorde is not only the first supersonic airliner to enter regular fare-paying passenger service anywhere in the world, it is also a supreme example of international collaboration on a major aerospace programme at the frontiers of technology. While admittedly the project has taken a long time, and a great deal of money, it has demonstrated conclusively that it is possible for two separate countries with different languages and cultures and two highly individualistic industries to work together in harmony.

The Concorde has also provided the impetus for a wide range of other international collaborative ventures in aerospace. It has taught the administrations of the two countries a great deal about controlling costs in such ventures. The civil servants on both sides of the Channel have been just as much breaking new ground in their share of administration and control of the programme as the manufacturers have been on theirs.

While the venture may be criticised by some for the length of its gestation and the price it has involved, it cannot be denied that it has made a major contribution to the advance of aeronautical science as well as to the history of transport. These are the things that are likely to be remembered long after the arguments about costs and social acceptability have been forgotten.

Although the Anglo-French Government treaty on the Concorde was signed on November 29, 1962, effectively marking the formal go-ahead for the programme, work on it had been under way on both sides of the Channel for several years previously, going back to 1954, initially through independent studies by the French Sud-Aviation company (eventually to become Aerospatiale) and by the Bristol Aeroplane Company (one of the forerunners of British Aircraft Corporation) and Rolls-Royce in the U.K.

The genesis of the Concorde

on the French side included such supersonic aircraft as the Sud 212 Durandal, the Sud 9000 Trident interceptor, the Nord Griffon, and the Dassault Mirage III and IV military types. Britain's supersonic experience major aerospace programme at the frontiers of technology. While admittedly the project has taken a long time, and a great deal of money, it has demonstrated conclusively that it is possible for two separate countries with different languages and cultures and two highly individualistic industries to work together in harmony.

Studies

In France, all the studies eventually resulted in a medium-range supersonic design, called the Super Caravelle, while the U.K.'s designs were coalescing into a long-range type of supersonic airliner. In September 1961, it was realised that the two emerging designs were sufficiently close in concept and configuration to permit a joint study to be made, and the two governments commissioned Sud-Aviation and BAC to study a joint design for a supersonic airliner.

The results of this study were examined through the summer of 1962, and agreement was eventually reached between the two Governments and manufacturers to enable a single design, research, development and production programme to be undertaken.

From the moment that the Anglo-French Government agreement was signed in November, 1962, the parties have worked closely together. One of the most significant things about the whole collaborative programme is the way in which the manufacturers have been able to maintain their close contacts, working on a most

friendly basis, even when their two Governments were strongly opposed on the political front. As Sir George Edwards (who has just retired from the chairmanship of BAC, having masterminded Concorde development on this side of the Channel all the way through), the two Concorde airframe and two engine manufacturers were at one time "just about the only people in Britain and France who were talking to each other." As a result of this collaboration, many lasting friendships have been built between workers on both sides of the Channel. Language has not been a problem, since many British workers have learned French, and many French have learned English.

Analysis

The broad analysis of this collaboration has been that BAC has been responsible for the air intakes, engine bay, droop nose, nose fuselage, forward fuselage, rear fuselage, fin, rudder and engine nacelles. Aerospatiale has been responsible for the intermediate fuselage, forward wing and centre wing, while the outer wing has been done by Dassault, the elevons by Rohr (which has also been engaged on the nacelles), while Hispano Suiza has done the main landing gear and Messier the nose landing gear.

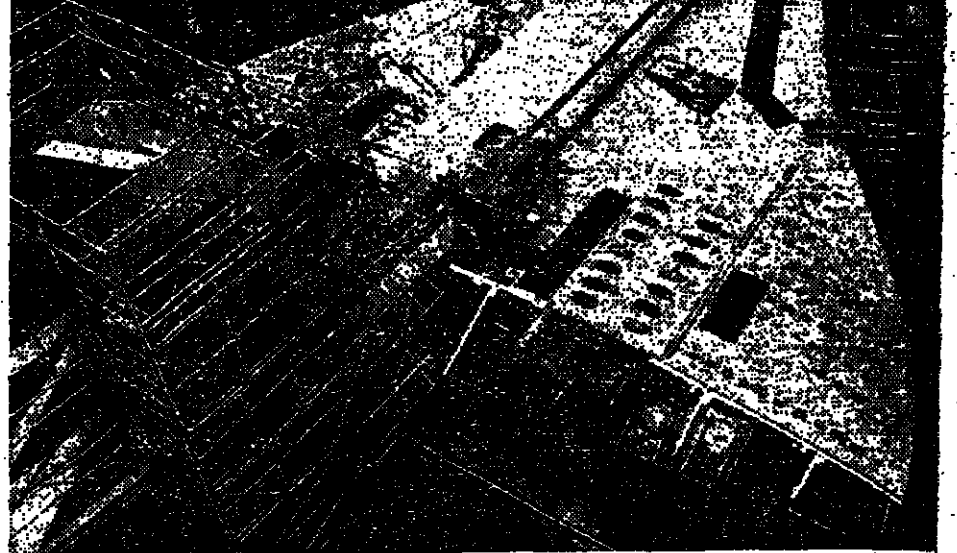
So far as systems are concerned, BAC has been ultimately responsible for the electronics, oxygen, fuel, engine instrumentation, engine controls, fire, air conditioning distribution and de-icing. Aerospatiale has been responsible for the hydraulics, flying controls, navigation, radio and air conditioning supply.

Many factories throughout the U.K. and France have been engaged on the work. BAC has brought into operation not only its Weybridge and Filton plants, but also Preston, for work on airframe parts, while Aerospatiale has been using not only Toulouse but also plants at Marignane, near Marseilles, Bougenais, and St Nazaire. At the peak of production, it has been estimated that at least 25,000 workers have been directly employed on Concorde

airframe and engine work on each side of the Channel, with many thousands more both directly and indirectly involved on the multitudinous systems involved in the aeroplane. At a rough estimate, therefore, probably about 75,000 workers in all on both sides of the Channel have derived employment either directly or indirectly for over 13 years on the Concorde programme.

One of the saddest aspects of the situation, at a time when the aircraft is about to enter fare-paying passenger service, is that this employment situation has just about passed its peak, and is now beginning to run down, because of the lack of orders. Already, both Aerospatiale and BAC have had to lay off labour, and to announce further redundancies for 1976, across the spectrum of Concorde workers, from the design office through to the shop floor. Earlier hopes that the aeroplane would have captured a substantial volume of orders in advance of its entry into service, so that the two assembly lines would be able to run at up to 10 or more aircraft a year each, have not been fulfilled, for a variety of reasons. One is the world economic recession, which has had a severe impact upon the world air transport industry, causing many airlines virtually to halt their equipment procurement programmes until conditions improve. Another undoubtedly has been the escalation in the price of the aeroplane, which at around \$50m. or so is more expensive than many airlines can afford, even those currently seriously interested in supersonic transport. Yet a third has been the marked growth of the environmental lobby in world aviation, that has resulted in a severe attack on the Concorde's own "social acceptability" and especially on its engine noise at take-off and landing. Many airlines throughout the world are sitting on the fence, waiting to see just how the aircraft performs in passenger service both economically and socially.

before they commit themselves to ordering it. As a result, the order book remains thin. Of the 22 aircraft authorised (two prototypes, two pre-production aircraft, one static test airframe, one fatigue test airframe, and 16 production aircraft) over half have been completed. The prototypes, the pre-production models and six of the production aircraft have all flown, and the static test and fatigue test airframes have been delivered to their respective test establishments long ago. Of the remaining ten Concorde on the line, two are so well advanced in final assembly and systems installation that they may have flown by the time these words are read, while the other eight are so far advanced that many sub-contractors and components manufacturers have completed their work, and have quit the programme. To try to keep the tempo going in anticipation of orders, the manufacturers have slowed down the pace of work options and letters of intent are turned into firm contracts. Whether this is done depends

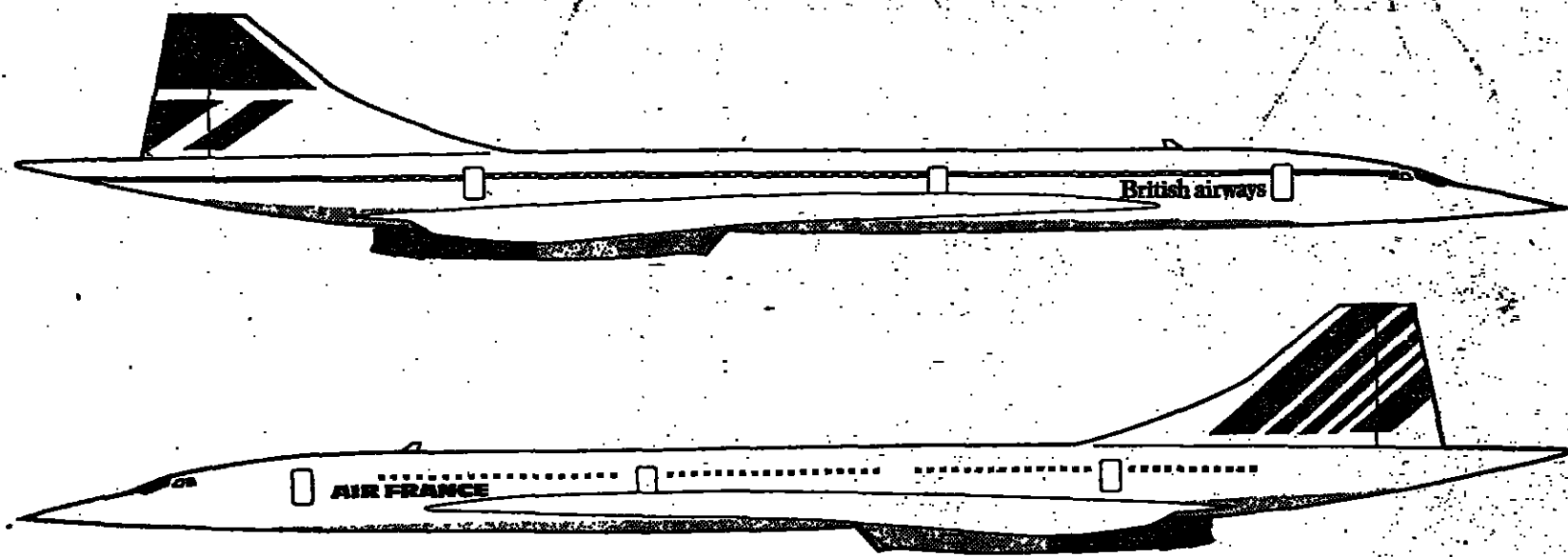


Part of the final assembly hall of the British Aircraft Corporation at Filton, Bristol, showing the eighth production Concorde (208) in the foreground in the background on the left is the 12th (212) and on the right the 14th (214). The picture indicates just how far down the road the Concorde programme travelled. A similar pattern can be seen in the Toulouse assembly hall at Aerospatiale.

to a large extent upon the U.K. and French Governments, both of whom are undergoing severe pressures themselves. U.K. Government is obliged to cut public sharply, are not authorised money on Concorde unless and when can see new orders horizon, if not actually up in the books. Thus, that the manufacturer have to struggle on 1976 on the slender production activities, in that Concorde can swing itself in-airline service generate demand from lines. Should it fail it has to be accepted, future, in terms of production, is bleak.

Orders

At this time the firm orders stand only at nine aircraft, of which five are for British Airways and four for Air France. Of the remaining seven, three could go to Iran Air and three to the Civil Aviation Administration of China, if current options and letters of intent are turned into firm contracts. Whether this is done depends



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The Financial Times Wednesday January 21 1976

A private Bill about to have its second reading in Parliament seeks to allow a big expansion of the building and construction activities of the Greater London Council and the London boroughs. Michael Cassell examines the controversy over local authorities' direct labour operations

Fair foundations for building council competition

A PRIVATE Bill sponsored by the Greater London Council and due soon for its second reading has become the centre of a rumbling controversy which now threatens to break out and embrace most of the construction industry and both major political parties.

The GLC (General Powers) Bill 1975-76 aims to extend the scope of local authority building and maintenance operations into areas previously the preserve of private contractors. By its opponents, the scheme is seen as another attempt to undermine private enterprise and bring closer the full-scale nationalisation of the construction industry.

The Bill sponsored by the GLC — whose own direct works department is undertaking 25m. of business this year — is so on behalf of the 33 London boroughs and the City of London. A successful passage for the Bill, which is being watched closely by local authorities in any parts of the country, would enable London councils to take on tender against each other for local authority building, repair and maintenance work but would permit them to step into the private sector in search of contracts for construction work like factory and office development and even motorway construction. Councils would also be able to offer their professional and technical services to private clients.

The reaction of private builders has been predictable. Their basic opposition is founded on the belief that local authority building departments are bad news for the customers and for the ratepayers.

Opinion among the contractors is broadly in line with Conservative Party thinking on the subject. What is of real concern to both is that the move by the GLC, in many ways, reflects current thinking within the Department of the Environment and, more specifically, in the mind of Mr. Reg Fresson, Minister for Housing and Construction. The Minister, who has set up a working party to examine direct labour departments and to provide a basis for their future development, believes that the role of these operations in building can and should be expanded.

Latest estimates suggest that public authority building departments account for around 14 per cent. of all public works construction, or 7 to 8 per cent. of all building output in the U.K. They are thought to employ some 165,000 operatives and Mr. Fresson says their continued

growth as a desirable means of increasing competition and, therefore, efficiency.

According to the builders, however, who have been lobbying the Minister and arranging protests and petitions, efficiency is the very last quality which can be associated with direct labour establishments. Mr. Ernest Smith, president of the National Federation of Building Trades Employers, can produce a long list of alleged past disasters to back this belief.

Private builders say that council departments can obtain contracts on the basis of an under-priced estimate, with all the extra costs having to be borne by the council. There can be no contract to limit the council's liability, as there is with a separate trading services of local authorities.

The Institute's findings have also been given broad approval by the Conservatives, in the shape of Mr. Timothy Raison, the "shadow" spokesman on the Environment, who is concerned about the prospect of expanding direct labour methods.

Above all, the private contractors claim that if the Government wants to expand direct work operations some attempt to enable a true comparison of costs between the private and public alternatives must be made. The many different forms of accounting employed in local authorities would have to be standardised before this could be done, but the contractors say that the amount of public money involved makes such a move essential.

Contractors' efforts to establish "fair and real competition" in the contracting field were recently given a big boost in a report from the Chartered Institute of Public Finance and Accountancy, which emphasised that direct labour departments were under no compulsion to tender competitively against

contractors and that competition was the only real means by which an authority could ensure genuine value for money. The report also called for tighter financial disciplines, including the publication of accounts and the formation of direct labour operations into separate trading services of local authorities.

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"In the first place, I would like to make it clear that I am against wholesale nationalisation of the building industry, although I have invariably been portrayed as something akin to a red gremlin.

"Private contractors, however, shouldn't cower in the corner at the prospect of an expansion of direct labour activities but accept the challenge of competition. If a great divide between the public and private building operation remains, in terms of opportunities for work there will be continuing pressure for nationalisation. If all contractors are placed broadly on the same footing, then any attempts at nationalisation can be fairly described as a matter of petty dogma and nothing more."

To the inevitable response from the private contractors that it is they who are at a

distinct disadvantage because of the lack of financial discipline shown by direct labour operations and that they have no fear of fair competition, Mr. Balfour Beatty says his plans for London should raise no objections on these grounds.

"The Bill states that the building department must earn enough to defray expenditure and separate audited accounts for the operations will also be required.

Mr. Fresson recognises that the costing and accounting practices adopted by direct labour departments should enable the efficiency of these operations to be properly judged and compared and his working party is now looking into these procedures.

As a man who feels that direct labour departments have a growing part to play in the growth of the U.K. contracting industry, he is certainly being left in no doubt as to the radical changes in operational procedures which the remainder of the construction sector thinks must first take place. Then, the industry emphasises, its well-known love of competition can be fairly put to the test.

Boroughs

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Losses

He claims that Coventry contractors have calculated that improvement work now being carried out by the city's building department at a cost of £7,000 a house could be done by them for £4,000. Norwich council has had to report losses in excess of £200,000 on four of its own housing schemes and Southwark council in London is holding an inquiry into the overspending of about £1m. on two direct-labour housing estates.

Direct labour methods, argue its opponents, are superficially attractive to local authorities because they are "non-profit making," but they claim that the absence of the need to earn a profit or record a return on turnover or assets employed removes

Scared

"I do not agree with Mr. Fresson's plans for the maximum possible expansion of these operations and am very concerned that they should not be used to undermine private enterprise," he says. "It is quite wrong that councils should be regarding this sphere of activity as an area for major expansion and we must have proper safeguards to ensure that if these departments are to continue they become subject to the same rules of accountability which apply to their competitors."

In the opinion of Mr. Richard

Civil Service earnings

Mr. Rogers ended with a call for "decisive Government action." May I suggest what that should be?

Obviously Mr. Mulley should get rid of the whole H.M. Inspectorate of Schools whose only raison d'être was to prevent the present state of affairs from arising.

If he would then, (a) replace the present inspectors with experienced teachers not under the age of 45, and charge them to insist on the successful teaching of basic skills.

(b) insist that every would-be teacher spends a year in a school as a teacher's assistant before going to college.

(c) insist on five years' teaching experience for all teacher-training lecturers.

(d) further insist that they return to the classroom for at least a year after every five years as a lecturer.

He would go down in history as the Minister who did most to get value for our truly enormous expenditure on education.

Douglas Dale.

"Birch Crest," Hilderstone Road, Meir Heath, Stoke-on-Trent.

The capital's future

From the Chairman, London and Regional Affairs Committee, London Chamber of Commerce.

Sir, — The recent statement of intent by the Leader of the Greater London Council and the decision last week of its Policy and Resources Committee to modify the title and terms of reference of the Strategic Policy Board are a welcome sign that local government in London has accepted some responsibility for reducing the outward movement of people and jobs from London.

For some seven years the London Chamber of Commerce and Industry has been pointing out that the strategic controls on employment — in the form of Office Development Permits and Industrial Development Certificates — coupled with extended planning procedures threaten the long-term stability of London as a commercial and industrial centre. In addition, the private rented sector of the housing market has been forced to contract for reasons which seem to owe more to a blind devotion to narrow dogma than to a rational assessment of how accommodation might most efficiently be made available to those who either do not need or cannot afford to buy.

The London Chamber has been an untiring advocate of a positive policy of reversing the trend of a declining population in London which has resulted in a narrowing of London's industrial base and a distortion of employment opportunities available to Londoners. Providing housing and employment in the expanding towns not only contributes nothing to solving the housing problem in London but by creating off expanding employment and skilled labour, leaves reduced opportunities for those who stay behind.

This is not to dispute the wisdom of the initial concept not only of the expanding, but also of the new towns, but the time has now come to take stock of the results and to introduce corrective measures where they are obviously necessary. These measures must now include a policy of encouraging the sectors of industry and commerce which wish to remain or set up in London to do so, and the GLC's measures are a welcome step along this road.

A. C. C. Trollope.

69, Cannon Street, E.C.4.

Pay policy and pensions

From Mr. D. G. Waddams.

Sir, — I wonder whether enough attention has been paid to the effect on pensions of the current pay restrictions.

The Retail Price Index for December, 1975, just published, shows that the index has risen 24.9 per cent. since December, 1974. This means that persons whose salaries for the 12 months from January 1, 1975, were fixed at, say, £10,000 per annum, now require an increase of £2,490 per annum just to keep pace with the RPI at the gross level. (To keep pace at the net level would, of course, require a much larger increase.) However, present restrictions permit no increase in all, even if one is called for under service agreements.

Such persons may well be due to retire in the course of the year or two and, where pensions are related to final earnings, the effect of the above will be to deprive them of a very substantial amount of pension which will penalise them for the rest of their lives.

D. G. Waddams.

"Longfield," South Brent, South Devon.

Minimum price for oil

From the Chairman, W. H. Jones and Co.

Sir, — From your columns (January 17) it appears that the British Government, together with other Governments of the EEC, are entering into an agreement to establish a minimum price for imports of oil.

I challenge any of your readers to justify such an act. Under what circumstances can it possibly be right to prevent oil entering this country at prices below £7 per barrel if it is available?

Newton Jones.

Whitstone, N.20.

A presumption of innocence

From Mr. R. Morsley Smith.

Sir, — The book review by C. P. Snow (January 8) — "A Presumption of Innocence: The Amazing Case of Patrick Meehan" — contains a distortion of the facts.

But Frederick Seddon protested his supreme innocence right up to the drop and William Herbert Wallace to the grave. Both were guilty as hell.

Actually William Herbert Wallace was found not guilty on appeal. Lord Shaw's remark is therefore a slur on the very British justice which he purports to revere. It is an unfair insult to someone who cannot fight back and I think that he ought to be remembered as a martyr.

R. Morsley Smith.

37, Lansdowne Square, N.1.

C. P. Snow writes: "I shouldn't have written so positively, of course, unless I was sure of my ground. A number of years ago, three colleagues and I were asked, for a TV programme to examine the evidence and present arguments for Wallace's innocence and equally for his guilt. We spent much time in Liverpool, talked to many people connected with the case (a lot of them were then still alive) and had to drop the project. Without taking, or abandoning, our intellectual honesty, we couldn't construct even a feeble argument for innocence. This has been the experience of others who have made similar investigations. I compare Mr. Fenton Bressler's recent admirable programme on TV, where he came to the same conclusion with the same finality as the rest of us."

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"Longfield," South Brent, South Devon.

Plugging the cavities

From the Secretary, Agreement Board.

Sir, — Last October the Government issued a Type Release (Direction No. 1) enabling many householders to have their wall cavities filled without the necessity of obtaining from their local authorities an individual relaxation of the Building Regulations. An essential requirement of this procedure is that the installation must be carried out under cover of a certificate issued by this Board.

On January 12 you reported that the National Cavity Insulation Association was seriously concerned by problems caused to householders in coastal areas through "misinterpretation" of the wording of the Agreement certificates concerned.

I am writing to inform you that this Board is aware of difficulties that can arise, in some cases, in the interpretation of the criteria in the present certificates of cavity fill, but at the time these were set down they were based on the latest technical data available, and were drawn up with a view to protecting householders from filling their wall cavities where conditions were not suitable.

More accurate information concerning the effect of local climatic conditions in relation to the filling of wall cavities is now available and this Board is at present redrafting the certificates in the light of this new data.

The Board is confident that these revised certificates will be easier to interpret and will undoubtedly have the effect of

Savings penalty

From Mr. J. L. Harrison.

Sir, — I was interested to read Mr. E. R. West's letter, January 17, regarding the bias shown by the Government against saving. One important point Mr. West missed is that this bias unfairly extends to those who are expected to take part of their pension as a lump sum and invest it.

So long as the surcharge on invested income was kept at 10 per cent. up to £2,000 I was not unduly affected. With the lowering of the limit to £1,000, however, the situation changed unfavourably. Had I elected to take my full pension annually I would be paying tax at the standard rate on an amount equivalent to the interest I receive from the investment. At the same time I would derive greater benefit from any increase in the pension fund than I was able to make.

While these have been good

Approximation to reality

From Mr. E. Clayton.

Sir, — There is a possibility of error in the reasoning used by Professor D. Myddelton (January 12) to reach the conclusion that Sandilands is "utter nonsense."

Using the example and assumptions chosen by Professor Myddelton it is clear that the investor, by reinvesting £750 of the proceeds of the sale of his equities, is left with exactly the same flow of gross dividends as before but with an additional £100 in cash to reinvest or to spend at will. This £100 would therefore seem to be some form of profit which has arisen from the business of investment.

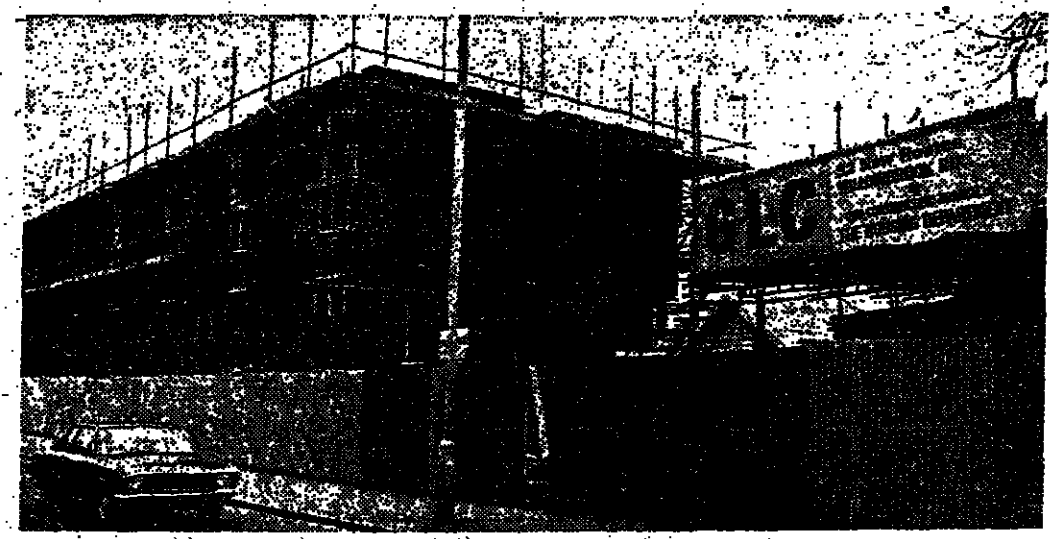
A very different situation arises if it is assumed that an investor is going out of business as an investor and is converting his equities, that is to say his operating plant and equipment into cash. It would be irrational to use a measure of replacement cost to assess this investor's financial position because no replacement of the equities is envisaged and, in these circumstances, it seems more reasonable to apply some form of current purchasing-power accounting to compare the original investment with the final realisation.

Sandilands is surely intended to provide an approximation to reality in a continuing business situation, and it seems illogical to use its replacement cost approach to assess a closure

Teaching the basic skills

Mr. D. H. Dale.

Mr. Rogers' article (January 13) seems to have been little noticed by Mr. Fred Mulley's recent speech. His recognition of the growing chorus of discontent is, I think, the first acknowledgement by a Minister of Education of the inadequacy of the teaching of basic skills in schools. This situation has been well known to a great many



A GLC housing development at Peckham, South London: now the Council is seeking powers for itself and the London boroughs to step into the private sector in search of building contracts.

Balfour Beatty, the young and politically ambitious chairman of the GLC housing development committee, and the man largely responsible for the Council's private Bill, people are getting unnecessarily scared about his own plans. In particular, about the more general question of incursion by local authorities into an industry where free enterprise is the catchword.

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"The Bill states that the building department must earn enough to defray expenditure and separate audited accounts for the operations will also be required.

Mr. Fresson recognises that the costing and accounting practices adopted by direct labour departments should enable the efficiency of these operations to be properly judged and compared and his working party is now looking into these procedures.

As a man who feels that direct labour departments have a growing part to play in the growth of the U.K. contracting industry, he is certainly being left in no doubt as to the radical changes in operational procedures which the remainder of the construction sector thinks must first take place. Then, the industry emphasises, its well-known love of competition can be fairly put to the test.

To-day's Events

- British Airways Concorde takes off from Heathrow at 11.30 a.m. on its first commercial flight, to Bahrain. Air France Concorde leaves Paris simultaneously for Rio de Janeiro.
- Mr. James Callaghan, Foreign Secretary, holds talks with West German Foreign Minister, Berlin.
- Mr. Roy Mason, Defence Secretary, attends meeting of NATO nuclear planning group, Hamburg.
- Prince Saud bin Faisal, Saudi Arabian Foreign Minister, arrives in Bonn.
- Greek Premier Constantine Karamanlis begins three-day official visit to Egypt.
- CBI Council meets, London.
- International Steel Institute issues figures of 1975 steel output.
- Inland Revenue annual report published.
- Engineering Industries Association trade mission in Japan.
- London Chamber of Commerce trade mission in Cuba.
- PARLIAMENTARY BUSINESS: House of Commons: Motion on suggested amendments to Trade Union and Labour Relations (Amendment) Bill.
- House of Lords: Debates on continuing growth of juvenile crime and on increased fees for overseas students.
- OFFICIAL STATISTICS: Consumers' expenditure (1st preliminary estimate—4th quarter).
- COMPANY RESULTS: Centre Hotels (Cranston) (half-year).
- Kenning Motor Group (full year).
- Thorn Electrical Industries (half-year).
- Union Discount Co. of London (full year).
- COMPANY MEETINGS: Devenish (J. A.), Weymouth, 12.30.
- Wolverhampton and Dudley Breweries, Dudley, 12.
- SPORT: Rugby Union: Gwent v. Australians, Pontypool.
- Soccer: League Cup semi-finals (2nd leg): Manchester City v. Middlesbrough, Newcastle v. Tottenham.

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COMPANY NEWS + COMMENT

Courts (Furnishers) profit expansion

TURNOVER FOR the half year to September 30, 1975 of Courts (Furnishers) expanded from £12.58m. to £16.92, excluding VAT, and pre-tax profit advanced from £1.81m. to £1.95m.

Trading in both the U.K. and overseas has been good so far in the second, traditionally more profitable, half year with the result that profits for the whole year are expected to show a "satisfactory increase" over last year's £3.05m., the directors state.

Three new branches have been added in the U.K. in the current financial year and three more are scheduled to open in the next few months. With over 100 stores trading in six countries, the group is "soundly based" for continuing further progress, the directors add.

The interim dividend is stepped up from 1.17 to 1.26p net per 23p share. Last year's total was 2.3551p.

	1975	1974	1973
Turnover	16,922	12,584	28,377
Operating profit	2,273	1,884	3,274
Profit before tax	1,467	1,431	3,485
Taxation	851	738	1,829
Profit	616	693	1,656
Interim dividend	1.17	1.17	1.17

The results were a record, achieved with increased profits from both U.K. and overseas stores. At the interim stage, exchange rate fluctuations have again been disregarded, but will be taken into account at the year end. To date they have been substantially in the company's favour, it is stated.

comment

Courts' interim results—operating profits some two-fifths higher—underline the impression given by furniture manufacturers and retailers alike over recent months, that demand has been strong, despite pressures on consumer spending. IIP business continues to recover from the restrictions imposed in December 1975 and, after a transfer to rather than from deferred profits, the pre-tax profit is a fifth higher. For the full year, Courts sees no sign of a deterioration in trading; indeed, the relaxation of IIP controls last month should give a further boost to business, particularly in the next financial year. Pre-tax profits this time should climb over £4m., before taking into account exchange rate gains—which have evidently been substantially in the group's favour. At 90p, the prospective p/e is no more than 12, which more than discounts the possibility of lower sales as real personal incomes come under pressure, and neglects the point that 40 per cent of profits are derived overseas.

Leda Trust

Gross revenue of Leda Investment Trust was little changed at £12.482, against £12.004, for the year 1975. Net profit came out

Company	Page	Col.	Company	Page	Col.
Assoc. Paper	32	2	Leda Investment	32	1
Baker Perkins	32	8	Local Loans	32	7
Bass Charrington	32	4	MEPC	32	8
Cantors	32	4	Midland Industries	32	4
Courts (Furnishers)	32	1	Nurdin and Peacock	32	5
Coventry Economic	32	3	Oxley Printing	32	4
Crosby House	32	3	Raglan Property	32	7
Eagle Star	32	8	Strong and Fisher	32	1
EMAP	32	7	Sunderland Shipbuilders	32	5
Houchin	32	3	Western Board	32	3

The capital expenditure programme, which has involved over £2m. in the last two years, has continued. A substantial part of new plant is still not fully operational and will not contribute to profits until later in the current year, the directors state.

Basic earnings per 23p share for the year 1974-75 are stated to be down from 11.5p to 4.2p and fully diluted from 8.9p to 3.7p.

As forecast and with Treasury consent the dividend is raised from 2.05p to 2.5p net, with a final of 1.5p on capital increased by the acquisition of Peerless Gold Leaf from Wilkinson Match.

comment

A move into second-half losses has left Associated Paper Industries' pre-tax profits over 70 per cent lower (excluding surplus property sales), but, in view of the current state of demand, even this level of profits may be hard to sustain. Paper-making, nearly half of profits last year, has suffered most, caught in the scissors' movement of rising pulp costs and competitive

prices on basic lines. Specialty papers and converted products, though not so exposed, have faced sharply lower demand. A hefty £2m. capital spending programme, reflected in almost trebled net interest charges, has transformed the balance sheet but is unlikely to contribute anything for some time. At 40p, down 31p last night, historic, fully-diluted earnings of 1.5p cover a dividend yield of 10.5 per cent, only 1.4 times.

Statement Page 39

	1974-75	1973-74
Turnover	27,899,771	22,735,874
Profit before tax	667,338	1,861,588
Tax & deferred profits	116,675	1,943,771
Net profit	550,663	2,005,359
Extra-ord. items	48,372	38,324
Minority interest	429,182	386,248
Minority and Prof. div.	23,280	22,560
Available Ordinary	307,522	1,614,111
Ordinary dividend	22,524	186,083
Surplus after charging depreciation	285,000	1,428,028
Reserves	2,949,500	1,428,028
Interest payable	277,465	277,465
Interest receivable	12,754	148,119
Interest on bank of fixed assets	138,753	111,111
Comprehensive surplus on re-valuation	114,582	111,111
Minority and cost of relocating	114,582	111,111
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Members are told that the recession is continuing into the current year, although there are some signs of revival on the converting side of the business.

Mr. Houchin says that while it is difficult to look too far ahead, he feels sure that the policy of caution in maintaining financial stability with a determination to expand further the overseas market will ensure the group's continuing success.

comment

Houchin's interim profits are only 13 per cent short of those for the full 1974-75 year and clearly substantial growth can be expected this year. Exports remain at some 44 per cent of

sales and overall volume has been strong, with special hopes now pinned on the group's new airport system for servicing planes in hangars instead of with the old mobile units. Both Heathrow and Brussels have now bought this system. Under Treasury rules, the group has scope for increasing its dividend—particularly as the cover (using last year's net payout) on latest 12 months profits is now up to 3.6 times. Debt has been eliminated from the balance sheet, and the shares at 60p offer an historic yield of just over 5 per cent.

Midland Industries record

ON A TURNOVER up from £2.34m. to £12.62m. pre-tax profit of the company and engineering group Midland Industries improved from £225,000 to a record £922,000 in the year to September 30, 1975. At the interim stage, when profit was up from £265,000 to £408,000, the chairman, Mr. E. C. Mansfield, said he confidently expected further progress in the second half.

Basic earnings per 3p share for the year are up from 3.18p to 3.99p basic and from 2.65p to 3.30p fully diluted. A final dividend of 0.2851p lifts the net total from 0.723p to a maximum possible 0.5044p net. A total of 0.5125p had been intended.

Dividends will be waived by the chairman, his family and a director in respect of 4,108,847 shares, reducing the total cost by £33,053 (£12,764).

Tax increased from £303,000 to £513,000 leaving net profit before an extraordinary item up from £232,000 to £409,000. The directors point out that a trading loss of about £92,000 by the Belgian subsidiary is not eligible for relief against U.K. taxation.

An extraordinary item of £83,000 (nil relates to the costs of terminating the trading operations of a Belgian subsidiary. Attributable profit after deducting this amount was £326,000, compared with £322,000.

comment

A slump in agricultural equipment markets virtually erased profits in Midland's engineering division (which accounted for 34 per cent of profits last year) and the balance sheet but is unlikely to division below break-even levels. So a 47 per cent increase in pre-tax profits for the year is due to an extra doubled profits in foundry, where castings for diesel engines have been a notable feature. A near one-third increase in capacity on this side should make it a safe bet in the current year, the Belgian company has been sold and engineering is now showing signs of recovery. Deferred tax and credit for finance have helped to eradicate last year's £366,000 overdraft leaving long term loans of £1.5m. to company with shareholders' funds of £1.5m.

comment

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Sir Henry Johnson (left), who retires as chairman of MEPC in March, talking at yesterday's annual meeting to his successor, Sir Gerald Thorley. Sir Gerald will also act as managing director following the resignation of Mr. Peter Anker.

DIVIDENDS ANNOUNCED

Company	Current payment	Date of payment	Current payment	Date of payment
Associated Paper	1.5	April 2	1.15	2.6
Cantors	0.75	May 4	0.85	1.65
Courts Furnishers	1.25	May 28	1.37	2.58
Leda Trust	1.37	Feb. 27	1.24	2.21
Midland Industries	0.4	Feb. 27	0.42	0.5
Raglan Property	Nil	Nil	Nil	0.25
Strong & Fisher	2	Mar. 30	1	3.69
Western Board Mills Int.	1.9	Mar. 10	0.9	2.76

Dividends shown pence per share net except where otherwise stated. * Equivalent after allowing for scrip issue. † On capital increased by rights and/or acquisition issues.

ing VAT, up from £3.43m. to £5.96m., and an expansion from £110,000 to £276,000 in pre-tax profit.

Both turnover and profits are records and indications to date are that those for the full year should again be a record, says the chairman, Mr. C. Cantor. The figures for the year to April 30, 1975, were £2.34m. and £462,000 respectively.

To the half year profit is added non-trading and extraordinary items £68,000 (£60,000) and £588,000 for the year.

Six new shops are due to be opened and one relocated before the end of April.

The interim dividend is effectively lifted from 0.8117p to 0.73p net per 20p share. Last year's total was equal to approx-

	Half-year	Year
Group turnover	1975	1974
Turnover excl. VAT	6,088	3,794
Profit	5,852	3,175
Profit before tax	276	122
Net profit	276	122
Other income	122	122
Balance	122	122
Cost of sales	122	122
Cost of sales	122	122
Cost of sales	122	122

comment

Nurdin and Peacock's sales growth, based on 40 per cent, is the first six months of 1975-76 is 28 per cent in the second. At this level volume must have been only marginally higher and, considering that profit margins were under pressure in the first six months, slipping from 1.45 per cent to 1.87 per cent—second half pre-tax growth is likely to be no more than modest compared with the 32 per cent gain at half-time. The group had no new openings in 1975-76 as suitable sites were very difficult to find and volume growth may have been held back by restricted capacity towards the year end. However, more sites are now becoming available and the group which, following the July rights issues now has no borrowings, is well placed for expansion. A full-year profit of around £2.5m. looks a safe bet for the 52 weeks to January 3, dividend, yielding 4.9 per cent at 1975, compared with the £2,078,000 85p more than four times.

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ISSUE NEWS

EMAP 1.5m. sha placing

East Midlands Allied Press has made arrangements to place 1.5m. District Council (£1m.) "A" Ordinary 25p shares at 32p each to raise £470,000, subject to shareholders' approval at an extraordinary meeting called for February 6.

The funds it is stated, will initially be used to reduce bank borrowings, which stood at £1m. in the last accounts to March 1975, and over the longer term to finance a substantial investment programme in Kettering and Peterborough.

The directors, in the absence of any unforeseen circumstances, intend to pay dividends totalling 2.8p per share (4p gross) for the year to March 27, 1976—the new shares will rank for the expected final of 1.5375p. As the forecast total represents an increase of 15.7 per cent over the payment for 1974-75, Treasury permission has been sought and obtained.

The directors point out that, during recent weeks, the market price of the "A" shares has not consistently been at a substantial discount to their par value of 32p—last night they closed at 32p and the Ordinary at 38p. So, they therefore decided that they could not count on a conventional rights issue being underwritten. Furthermore, the directors and their families would not have been able to subscribe for their full entitlement under a rights issue.

The shares have been principally placed with institutional investors.

F & C EUROTRUST

F & C Eurotrust has arranged a new three-year multi-currency loan facility of £15,000,000 with Williams and Glyn's Bank.

SHORT-TERM LOCAL LOANS

The coupon rate on this week's batch of local authority yielding bonds has inched up from last week's 10 1/2 per cent to 10 3/4 per cent at par. The bonds are due on January 26, 1977.

This week's issues are: Chorley Borough Council (£1m.), South Wight Borough Council (£1m.), East Cambridgeshire District Council (£1m.), Oxfordshire County Council (£1m.), London Borough of Harrow (£1m.), City of Edinburgh District Council (£1m.), Metropolitan Borough of Sandwell (£1m.), Strathclyde Regional Council (£1m.), Borough of Thamesdown (£1m.), London Borough of Tower Hamlets (£1m.), Borough of Newcastle under Lyme (£1m.), Bury Metropolitan Council (£1m.), City of Salford (£1m.), Fenland District Council (£1m.), Roxburgh District Council (£1m.), the Receiver for the Metropolitan Police District (£1m.), Cleveland County Council (£1m.), Fareham Borough Council (£1m.), Vale of White Horse District Council (£1m.), Strathkelvin District Council (£1m.), City of Wakefield Metropolitan District Council (£1m.), Blaby District Council (£1m.), Boston Borough Council (£1m.), Metropolitan Borough of Wigan (£1m.), Dacorum District Council (£1m.), Metropolitan Borough of

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INTERNATIONAL COMPANY NEWS + EURO MARKETS

Marine Midland fourth quarter loss

BY GUY DE JONQUIERES

MARINE MIDLAND Banks, the twelfth largest bank holding company in the U.S. with assets of more than \$11bn., disclosed today that it made a net loss of \$12.4m. during the fourth quarter of last year.

The loss, which compares with a net profit of \$8.9m. or 71 cents per share in the same quarter of 1974, had been forecast by the management last November when it cut the quarterly dividend to 20 cents from 45 cents per share. Its size is broadly in line with expectations on Wall Street.

Marine Midland's results for the year were also sharply depressed. Net profit before securities transactions fell to \$16.4m. or \$1.30 per share from \$37.6m. or \$3.15 per share in 1974.

Marine Midland's quarterly loss—the first to be reported by a bank of comparable size for several years—was due principally to large loan losses

incurred by its London merchant banking subsidiary, Intermarine, between 1971 and 1974.

In addition, the company said that a "major portion" of its loans to Real Estate Investment Trusts, which total \$205m., has been classified as non-income producing or renegotiated at a lower rate of interest.

As forecast by the management, Marine Midland's loan loss provisions were substantially increased during the fourth quarter, rising to \$89.8m. from \$13m. during the same period of 1974.

For the year as a whole, the loan loss provision was raised to \$84m. from \$31.2m. This exceeded by \$9.7m. the actual amount of loan losses charged against the provision, \$54.3m. in net loan losses were charged off last year, up from \$25m. in 1974.

Mr. Edward Duffey, Marine Midland's chairman, said that during the final quarter of last

year, all classes of deposits had increased while reliance on borrowed funds had diminished. He added that interest margins had improved during 1975 and that operating expenditures were restrained.

Marine Midland's results for the fourth quarter and the whole of last year compare unfavourably with those so far reported by other banking concerns. According to a table compiled by Salomon Brothers, 21 of the 32 companies which had reported by the end of last week showed increased fourth quarter earnings, ten recorded falls and one was unchanged.

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Bradken and Tubemakers bid moves

By James Ford

SYDNEY, Jan. 20. BRADKEN Consolidated, Australia's largest steel founder, and Tubemakers of Australia, the biggest steel pipe manufacturer, today announced major takeover moves in iron founding.

Bradken paid \$45.945m. in cash and shares for McKelvey's, one of the largest iron foundries in Australia. It is a big supplier of pressure vessels to New South Wales water supply authorities. Tubemakers is negotiating to acquire Amcast Engineering Company, a supplier of pressure vessels to Victorian water supply authorities.

The consideration for the McKelvey deal was \$43.95m. in cash and 450,000 Bradken shares, currently priced at \$43.10.

The takeover is interesting because it means that Bradken has now issued all but 8,561 shares of its authorised capital. As elsewhere, Australian company law provides that a company's paid capital cannot exceed its authorised capital.

Bradken directors sought permission at the annual meeting last November to increase the authorised capital to leave room for further issues of shares but was blocked by its major shareholders.

West German SE turnover more than doubled

BY GUY HAWTHORN

TURNOVER more than doubled on the West German stock exchanges in 1975. The year saw a tremendous increase in interest in equities, probably spurred by falling interest rates and the reduced earnings potential in the bond market.

In the case of certain shares, analysts here are talking of a "turnover explosion." Figures produced by Hoppens-Verlag, the leading financial publishing house, show that in the case of the three of a massive restructuring programme (54.7 per cent.). There were even higher turnover rates recorded for Klockner-Humboldt-Deutz (72.2 per cent.) and Mannesmann (75.2 per cent.).

There were similarly high figures for Linde, the chemical concern (50.4 per cent.) and Volkswagen which has been in the throes of a massive restructuring programme (54.7 per cent.).

Turnover in Conti-Gummi, West Germany's leading tyre manufacturer, equalled 63.7 per cent. of shares issued. Interest

was no doubt stimulated by reports in June that Continental Gummi-Werke was back on the road to profitability after three years in the red. By the end of the year, chances of break-even were fading in face of fluctuating currency rates, high wage costs and competition from third world producers.

Deutsche Bank, the largest of West Germany's commercial banks, also saw a hefty increase in share trades. The bank, which had a particularly good year in 1974, and an even better one last year, registered a turnover equaling 53.2 per cent. of issued equity.

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Turnover in Conti-Gummi, West Germany's leading tyre manufacturer, equalled 63.7 per cent. of shares issued. Interest

FRANKFURT, Jan. 20.

last year—particularly about newly oil-rich Arab magnates who were said to be building up major holdings in leading German concerns. Hoppens-Verlag analysts, however, point out that despite the huge turnover increase there were no signs of really substantial new holdings being built up.

They also commented that moves to limit shareholders' voting rights appeared to have little effect on the popularity of shares. BASF, Bayer, the Deutsche Bank and Mannesmann had introduced limitations on voting yet, despite acrimonious debate at the annual meetings, the shares of all four concerns remained much in demand with high turnover rates.

AEG-Telefunken held the 1975 record for shares traded in a single day with a turnover of 68.781. It was followed by VW with 39.843, Siemens 37.939, BASF 37.747, Deutsche Bank 34.899, Bayer 33.379, Hoechst 32.592, Veba 30.862, Thyssen 28.753, and Mannesmann 26.424.

New issue from Uddeholm

By William Dullforce

STOCKHOLM. Uddeholm, the forestry and steel company, announced today that it was planning to strengthen its financial position by issuing shares after a pre-tax earnings from Kr. 1974 to Kr. 1975, co with the Kr. 1976 profit in 1975. Turnover rose some Kr. 180m. to (225m.), according to preliminary estimates yesterday.

Mr. Gunnar Westman, managing director, bi poorer performance recession in the paper and steel market and forecasts a further earnings this year. He expects a "substantial" market recovery should with completion of the Kr. 1.6bn. (€180m.) 1974 expansion programme.

The financing of it must as well as the working capital, as reason for increasing capital by Kr. 232.2m. to (€66.2m.). The Board p do this by a new issue three at a price of 1 share to be followed by a share issue of one for

Taking a price of Kr. 1.60, Uddeholm Exchange and making allowance dividend, an Uddeholm would be worth Kr. 1.10 preference issue. The bonus would also be eligible dividend. The bonus shares to be bought up the the concern's farm a property.

If taken up in full issues would bring Kr. 1.45m. (€16.5m.) in world shareholding capacity.

SKF takes 66 of Sarm

By John Walker

STOCKHOLM. SKF, the Swedish ball-bearing group, has acquired 66 per cent. holding in a concern, Societe Anon Appliance (Sarma), announced today. The company manufactures structural rods, flange rods, and control cables. It also produces and repairs helicopters with Sarm products.

Sarma has two factories in Rhone valley and em 480 people. In the 1975, 50 per cent. of the income came from exports. The French strengthens SKF's i the aerospace industry manufacturing prog Sarma complements French SKF's primary operations du Rouleau which produces min elision and spherical rollers.

Scandinavian Bank grows

By Mary Campbell

SCANDINAVIAN Bank, the London-based bank, announced today that it was planning to increase its capital by £20m. to £100m. The bank says that all of its outstanding in shipping but all it says it has not been in any kind where it The bank is to open a representative office in March 1.

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Bell & Howell write off

BY JAY PALMER

BELL AND HOWELL this morning announced that it has decided to phase out and gradually discontinue its correspondence courses, a unit of its electronic technology schools division. The company explained that the operation was consuming "inordinate management time and expertise" and was nevertheless faced with "escalating costs and permanent unprofitability."

The company said that it will immediately halt all further sales of the courses but that it will continue to complete all the existing three- and five-year programmes of lessons. Pointing out that this deferred shutdown meant that write off costs could not be projected with certainty, a spokesman said that 1975 earnings will be charged with a preliminary \$18m. after taxes.

Although Bell and Howell refuses to confirm outside estimates, it is being widely assumed that the home study operations constitute only a small part of the overall schools division. In 1974 the entire schools operation contributed less than 10 per cent. of the company's total profits with perhaps a third of this coming from home correspondence.

Announcing these plans, the company also forecast that its final quarter 1975 earnings will be in the region of 55 cents a share. This would lift the full year's earnings to about \$2.90 a share—against \$2.72 in 1974—with about \$2.20 directly attributable to continuing operations.

Assuming a 1975 tax rate of about the historical norm of 48 per cent., these company estimates suggest that 1975 earnings from continuing operations will amount to \$21m. net. If included, the year's profit from the home study business might have lifted the figure to nearly \$13m.

The company refused to comment on the fact that however small the operation, the home study write off is estimated to exceed the entire group's 1975 net earnings. It was noted that the group's 11,000 existing home student courses will be an expensive negative cash flow operation over the next five years.

The news of the company's plan produced very little reaction on Wall Street where the shares have been suspended from trading since yesterday morning.

Mr. Edward Duffey, Marine Midland's chairman, said that during the final quarter of last

year, all classes of deposits had increased while reliance on borrowed funds had diminished. He added that interest margins had improved during 1975 and that operating expenditures were restrained.

Marine Midland's results for the fourth quarter and the whole of last year compare unfavourably with those so far reported by other banking concerns. According to a table compiled by Salomon Brothers, 21 of the 32 companies which had reported by the end of last week showed increased fourth quarter earnings, ten recorded falls and one was unchanged.

For the year as a whole, 23 banking concerns reported higher earnings and nine a reduction in earnings. But Salomon Brothers also warned that it did not expect the generally positive picture emerging from these results to be sustained when all the major bank results were in.

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For the year as a whole, 23 banking

THAMES ST

FT SHARE INFORMATION SERVICE

BRITISH FUNDS

1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2433	2434	2435	2436	2437	2438	2439	2440	2441	2442	2443	2444	2445	2446	2447	2448	2449	2450	2451	2452	2453	2454	2455	2456	2457	2458	2459	2460	2461	2462	2463	2464	2465	2466	2467	2468	2469	2470	2471	2472	2473	2474	2475	2476	2477	2478	2479	2480	2481	2482	2483	2484	2485	2486	2487	2488	2489	2490	2491	2492	2493	2494	2495	2496	2497	2498	2499	2500	2501	2502	2503	2504	2505	2506	2507	2508	2509	2510	2511	2512	2513	2514	2515	2516	2517	2518	2519	2520	2521	2522	2523	2524	2525	2526	2527	2528	2529	2530	2531	2532	2533	2534	2535	2536	2537	2538	2539	2540	2541	2542	2543	2544	2545	2546	2547	2548	2549	2550	2551	2552	2553	2554	2555	2556	2557	2558	2559	2560	2561	2562	2563	2564	2565	2566	2567	2568	2569	2570	2571	2572	2573	2574	2575	2576	2577	2578	2579	2580	2581	2582	2583	2584	2585	2586	2587	2588	2589	2590	2591	2592	2593	2594	2595	2596	2597	2598	2599	2600	2601	2602	2603	2604	2605	2606	2607	2608	2609	2610	2611	2612	2613	2614	2615	2616	2617	2618	2619	2620	2621	2622	2623	2624	2625	2626	2627	2628	2629	2630	2631	2632	2633	2634	2635	2636	2637	2638	2639	2640	2641	2642	2643	2644	2645	2646	2647	2648	2649	2650	2651	2652	2653	2654	2655	2656	2657	2658	2659	2660	2661	2662	2663	2664	2665	2666	2667	2668	2669	2670	2671	2672	2673	2674	2675	2676	2677	2678	2679	2680	2681	2682	2683	2684	2685	2686	2687	2688	2689	2690	2691	2692	2693	2694	2695	2696	2697	2698	2699	2700	2701	2702	2703	2704	2705	2706	2707	2708	2709	2710	2711	2712	2713	2714	2715	2716	2717	2718	2719	2720	2721	2722	2723	2724	2725	2726	2727	2728	2729	2730	2731	2732	2733	2734	2735	2736	2737	2738	2739	2740	2741	2742	2743	2744	2745	2746	2747	2748	2749	2750	2751	2752	2753	2754	2755	2756	2757	2758	2759	2760	2761	2762	2763	2764	2765	2766	2767	2768	2769	2770	2771	2772	2773	2774	2775	2776	2777	2778	2779	2780	2781	2782	2783	2784	2785	2786	2787	2788	2789	2790	2791	2792	2793	2794	2795	2796	2797	2798	2799	2800	2801	2802	2803	2804	2805	2806	2807	2808	2809	2810	2811	2812	2813	2814	2815	2816	2817	2818	2819	2820	2821	2822	2823	2824	2825	2826	2827	2828	2829	2830	2831	2832	2833	2834	2835	2836	2837	2838	2839	2840	2841	2842	2843	2844	2845	2846	2847	2848	2849	2850	2851	2852	2853	2854	2855	2856	2857	2858	2859	2860	2861	2862	2863	2864	2865	2866	2867	2868	2869	2870	2871	2872	2873	2874	2875	2876	2877	2878	2879	2880	2881	2882	2883	2884	2885	2886	2887	2888	2889	2890	2891	2892	2893	2894	2895	2896	2897	2898	2899	2900	2901	2902	2903	2904	2905	2906	2907	2908	2909	2910	2911	2912	2913	2914	2915	2916	2917	2918	2919	2920	2921	2922	2923	2924	2925	2926	2927	2928	2929	2930	2931	2932	2933	2934	2935	2936	2937	2938	2939	2940	2941	2942	2943	2944	2945	2946	2947	2948	2949	2950	2951	2952	2953	2954	2955	2956	2957	2958	2959	2960	2961	2962	2963	2964	2965	2966	2967	2968	2969	2970	2971	2972	2973	2974	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Lebanon: Guerillas clash with army

BY OUR FOREIGN STAFF

NO SOLUTION to the Lebanese political crisis was in sight last night as Moslem, Leftist and Palestinian forces—strengthened by thousands of men from across the Syrian border—fought for full control of the north, east and south of the country and clashed with Arab units.

Amid heightened international concern, the identity of the reinforcements from Syria, who were reported to be anything from 3,000 to 8,000, remained a critical factor in the deteriorating situation.

There appeared to be little doubt that the ranks of the forces fighting the Right-wing Christian militia in the Bekaa Valley in the east and the Akkar region in the far north had been swollen from the Palestine Liberation Army's "Yarouk" Brigade which is stationed in western Syria.

But many may also be reinforcements from the Damascus-sponsored guerrilla movement.

Yesterday in Damascus, officials strongly denied the claim of Mr. Camille Chamoun, Lebanese Minister of Interior and Maronite Christian leader, that units of the Syrian Army had entered Lebanon.

In Israel, which has threatened retaliation against any direct Syrian intervention, the Government still appeared to be viewing the situation coolly, although Mr. Yitzhak Rabin, the Premier, was considering postponing his forthcoming visit to Washington.

Mr. Shimon Peres, Minister of Defence, repeated his earlier strong terms, saying Israel would have to take "defensive measures" if there was a Syrian invasion.

But there are still divided views as to if and to what extent the PLA unit should be regarded as Syrian forces.

Mr. Chamoun qualified his allegation of Monday night that 15,000 Syrian troops had crossed the border to the extent of saying: "Some people say they are from the 'Yarouk' Army, some people that they are the Syrian Army."

U.N. appeal

He added, however, that it "amounted to the same thing" because elements of the PLA needed the permission of Damascus to cross the border and the corps was not only Syrian-trained but also Syrian-armed.

An route for Moscow, Dr. Henry Kissinger, U.S. Secretary of State, issued a statement calling on "all outside powers"—including Israel and Arab countries—not to intervene.

Dr. Kurt Waldheim, UN Secretary-General, appealed for an end to strife after a meeting with the chief Lebanese delegate.

Hopes for conciliation now centre heavily on Syria. Last night, it was announced that Mr. Abdel Halim Khaddam, Syrian Foreign Minister, and Major-General Chehab, Chief of Staff, as well as Major-General Najj Jamil, were flying to Beirut for consultations with President Frangieh.

President Hafez Assad yesterday received a delegation representing Lebanese Leftist groups headed by Mr. Kamal Jumblatt, the Socialist leader and Druze chief.

A ceasefire which had been agreed on the telephone last night between Presidents Assad and Frangieh soon broke down.

Telephone communications with the north and east were cut, but reports said that the Palestinian and Leftist forces had over-run Army outposts in the Akkar region and were besieging the Christian town of Al Qayyat.

In the Bekaa Valley they were attacking Zuhle which was being defended by army units.

In the Quarantine district of Beirut, taken by the Christian Phalangists on Sunday, a Moslem pocket of opposition was still holding out.

Crisis in Lebanon, Page 7

Power bills will rise 15%—20% by midsummer

BY ROY HODSON

A SERIES of electricity price rises during the next few months will put up bills for both domestic and industrial consumers by between 15 and 20 per cent by mid-summer.

The Electricity Council is now completing the details based on the annual figures submitted by the area electricity boards.

But already it is certain that the Council will have to ask the Government for the maximum increases in its tariffs allowable under the Prices Code.

The Council is looking for permission to raise prices by an average 10 per cent from April. Industry would pay some 8 per cent more and domestic users over 10 per cent more. In addition, the electricity industry is allowed to pass on extra fuel costs. It expects to add 1 per cent from April to cover increased fuel bills during the past year.

But the National Coal Board is also expected to seek price rises for coal from April. Any such rises will work their way through to electricity consumers by about July. Thus, electricity bills will reflect higher coal prices by an additional increment of between 5 and 10 per cent by mid-summer.

The Electricity Council is seeking some £200m. to £300m. extra revenue from electricity sales in the coming financial year. As a result, the price of electricity will have to go beyond 2p a kilowatt.

The electricity industry is also negotiating with the Government to have electricity removed from the scheme for selective price restraint by industry.

Although electricity prices have doubled during the last two years and further rises are now inevitable, consumers are not showing a greater reluctance to pay their bills. According to figures compiled by the Electricity Council, the ratio of bad payers remains static. Out of 16m. consumers, some 10,000 are disconnected for more than a week at any one time for not paying their bills.

CBI view

The Confederation of British Industry said yesterday that nationalised industry price increases when justified by Government subsidies.

"No-one in industry likes additional costs when we are doing our best to hold down inflation. However, the CBI has long maintained that nationalised industry prices should reflect their costs."

The CBI would object far more to the Government attempting to hold down prices with subsidies which would increase the public borrowing requirement.

Companies and the tax season

Credit conditions eased in the money market yesterday and there were still no obvious signs of any concentrated Corporation Tax paying season following the new penalties for late payment. The message perhaps is that relatively small sums of mainstream CT are involved—certainly compared with amounts like £600m. or so being paid over for gifts last Thursday and £325m. coming back in released Special Deposits on Monday.

The Chancellor has made it clear that primarily as a result of stock appreciation relief the CT take this year is going to be very small. The last budget forecast total receipts of £2.1bn.—representing a fall from 20 to 12 per cent of total direct tax receipts. And to judge by the sector financial accounts for the first three quarters of 1975, ACT could account for nearly half this amount. This is paid throughout the year in line with dividends and will represent the only tax payment for a large number of U.K. companies this year. Despite the tax concessions, the corporate sector was still in deficit in the third quarter of 1975. But a slight deterioration compared with the second quarter is entirely accounted for by the purchase of three expensive North Sea oil platforms and the figures should look much healthier from now on.

Baker Perkins

On paper, the idea of putting new equity capital into Baker Perkins seems absurd. The share price has made no overall progress over the last 15 years. The return on capital employed has averaged less than 11 per cent over the last decade, and has not touched double figures since 1970. Large chunks of shareholders' funds are tied up in unprofitable operations—notably the U.S., which was making big losses a year ago and took up \$8.9m. of capital employed last March. Spending while the market is advanced some 15 per cent a big two-way trade in weeks has emphasised the extent of the narrow appraisal of the company of the results for 1975. But a further dividend of 8 pence, obvious attractions of pre-tax profits emerge \$5.5m.-£6m. range which is expected from the earnings in the first second half is usually profitable. But a rather bearish school of the been developing, and which July-December show a further decline to not much more than tax for the full year. However, would provide 1.3 times cover for a payout.

Uncertainties at arise first from the fact that volume—first over was down 28 p largely due to ch personal loans, and from adverse economic conditions. The compar additional bad debt of £3.9m. in 1974, national unemployment as though 1969's profits peak is 6 per cent more at last going to be exceeded this year, with profits of around £4m. dent it is still asse pre-tax in view. And the hope had debt position, but is that a growing export business—now accounting for as been satisfactory five much as three-fifths of U.K. is facing the worst tra output—together with a return to measureable profits in the volume, there was a U.S. will carry the group through 1976-77.

Of course Baker Perkins has its share of false dawns. Next month's EGM will provide an admirable opportunity to explain why things are going to be different this time.

See also Page 32

Longer run prosp fair. But it would n prising to see the I a fairly cautious month; an outturn Financial has been stuck within a 75p-80p trading range £4.5m. pre-tax may t (the shares are currently 76p) guess at this stage.

Doubts on future of steel chief

BY ADRIAN HAMILTON

IT SEEMS increasingly unlikely that Sir Monty Finistoun will stay on as chairman of British Steel after his current contract runs out in September.

In a talk to a Birmingham Chamber of Commerce meeting yesterday Sir Monty referred to the time in "September when I depart this glorious life."

Although there may have been an element of flippancy in the remark, this is the first time that he has referred in public to the prospect of his leaving the job in September.

The reference undoubtedly reflects a growing acceptance on Sir Monty's part that the Government is most unlikely to renew his contract for a second year.

While Sir Monty has kept well out of the latest conflict between the unions and the Corporation over labour-shedding, previous incidents in his relations with the unions and the Department of Industry make Ministers feel a new man is needed.

On his side Sir Monty, while not refusing to be considered for extension of his contract, is re-

March poll in Speaker's constituency

BY RICHARD EVANS,
Lobby Correspondent

MR. SELWYN LLOYD's announcement yesterday that he will resign as Speaker of the Commons on February 3 means there will have disappeared by election in the Wirral, a safe Tory seat.

The other by-elections pending at Coventry North West and at Carlisle, make it almost certain that the Government's present overall majority of one will have disappeared by the end of March.

In view of the latest unemployment figures, the Tories are increasingly hopeful of capturing Coventry North West, where Labour had a majority of under 7,500 in the 1974 election, and on increasing their majorities at Carlisle and the Wirral.

Mr. Lloyd, a well respected Speaker since 1971 and before that Foreign Secretary and Chancellor of the Exchequer, held the Wirral with a majority of over 13,000 in the last election.

The Conservative candidate is Mr. David Hunt, a former national chairman of the Young Conservatives who caused a furore at a Conservative Party conference four years ago by publicly attacking Mr. Enoch Powell.

Mr. George Thomas, the present deputy Speaker and Labour MP for Cardiff West, is almost certain to be elected Speaker on February 3, as he has the support of Conservative as well as Labour MPs.

One of the present deputy chairmen of Ways and Means, Mr. Oscar Morgan, Conservative MP for Pease, will carry on, leaving a vacancy for another deputy chairman.

The Conservative Party could decline to fill the vacancy, thus causing a further erosion of Labour's majority, but the indications last night were that they would be prepared to put up a candidate.

The Speaker and his deputies are not entitled to vote in the Commons.

Men and Matters, Page 14

Bank's leading role in Tremlett settlement

BY MICHAEL LAFFERTY, CITY STAFF

THE BANK of England played a leading role in the negotiations which led to a last-minute settlement yesterday of Tremlett's £5m. legal action against City accountants Arthur Young McClelland Moores; merchant bankers Dawson Day; and the directors of Tower Assets.

The Bank's intervention, through an intermediary, was designed to avoid a major public dispute involving these two well-known City concerns.

The action arose from Tremlett's takeover in 1974 of Tower Assets, the timber and furniture group, and particularly concerned the Dutch Fijnhout group of companies, which were later found to be in serious financial trouble.

The overall settlement in respect of the claim is approximately £75,000, a condition being that all allegations against the defendants are withdrawn. In addition the settlement provides a sum of about £275,000 for costs incurred by Tremlett.

'Stood aloof'

An agreed statement issued yesterday by all the parties concerned stated that Dawson Day's "total contribution to the settlement is the payment of £54,000 towards Tremlett's costs." Subsequently Mr. Charles Wilson, managing director of Dawson Day, said his banking group had not joined in any of the settlement talks. "We stood aloof from them," he said.

Mr. Wilson's remarks provoked Arthur Young to issue a formal statement saying: "The talks leading up to the settlement were not initiated by us. As far as we are concerned the settlement would not have been reached unless all the defendants had participated. All negotiations in which we were involved relating to the settlement were conducted on this basis."

Mr. Wilson said it was only when it became known late last Friday that such a small gap divided the parties that Dawson Day agreed to make the £54,000 contribution. It was a condition

Lucas gains recognition

LUCAS ELECTRICAL, the Lucas group's vehicle-oriented division, has become an approved supplier to the Defence Ministry's most exacting quality requirements, Defence Standard DS-21.

The Ministry investigation covered design facilities, commercial departments, production engineering, and manufacturing processes.

Lucas Electrical decided to achieve the top standard partly because such quality procedures will match standards of U.S. federal authorities, and partly because NATO approval, important in competing in Europe.

Talks on the Channel

British and French officials are to meet in Geneva, possibly later this month, to settle problems relating to their countries' rights in the English Channel, according to informed sources quoted in Geneva by Reuters.

The questions were originally supposed to have been regulated by the UN Law of the Sea conference, but the slow progress of this forum has made bilateral talks necessary.

Continued from Page 1 Jobless post-war peak

many of the students are genuinely seeking work when they register.

Students apart, there is no questioning the increasing seriousness of the U.K. unemployment problem.

While the basic figures may be the result of a large flow on and off the register in each month—averaging 373,900 joining and 395,500 leaving in the October-December quarter—it is estimated that some 981,000 of the people aged under 60 on the register this month have been unemployed for longer than four weeks.

Less up-to-date estimates (based on figures to October) suggest that in Great Britain at that time 357,000 people had been out of work for between two months and six months, and a further 154,000 for between six months and a year.

In addition to the fully unemployed, there were a further 140,000 people on short-time working in mid-December, according to Department of Employment estimates.

The official figures for vacancies notified to employment exchanges also paint a depressing picture, with a further drop of 5,600 to 109,200 in the seasonally adjusted statistics this month.

A regional breakdown shows that between December and January the biggest changes have occurred in East Anglia, the South-West and the West Midlands, where unemployment has in each case risen 0.3 per cent, age points to respectively 4.6, 6.0 and 5.4 per cent.

The U.K. average this month of 5.2 per cent, seasonally adjusted, was 50 per cent unemployed in 1945, with variations from 3.7 per cent in the South-East to 6.6 per cent in the North, 6.5 per cent in Wales, 6.1 per cent in Scotland, and 4.8 per cent in Northern Ireland.

TUC leaders last night described the figures as "disturbing" and "disastrous" and made it clear they would continue to press the Government to take steps to reduce jobless levels.

Ford flies conservative colours

BY JUREK MARTIN, U.S. EDITOR

THE ECONOMIC IMPACT of President Ford's State of the Union message last night is reckoned here to be broadly neutral. As was widely expected, the President eschewed grandiose new programmes and concentrated on technical improvements in certain alling sectors of the economy.

Most of his proposals had been advanced before, either by himself or other members of his Administration. It has been known for some weeks that Mr. Ford would recommend a further \$10bn. tax cut to go with the \$18bn. reduction due to expire in the middle of the year, but that he would balance this by reducing Federal expenditures to a \$395bn. ceiling, \$20bn. below what they would have been if economies had not been exercised.

In fact, Mr. Ford has taken a certain pride in reducing spending to below \$395bn.—to \$384.2bn. to be precise—which, according to Administration projections, will produce a Budget deficit of \$43bn. in fiscal 1977, compared with an estimated \$70-\$75bn. deficit in the current year.

AN this, however, had been so well publicised in advance that it produced minimal reactions from Congress, which tended to see both the tone and content of his address in straight forward political terms. By favouring defence over welfare spending, and by providing direct assistance to local governments and businesses instead of increasing Federal programmes, Mr. Ford has nailed his colours to the conservative mast, meeting Governor Reagan, his Republican challenger, head on in the battle for the Republican Right while entirely sacrificing the middle ground.

The President did provide a few items for the business community to chew over. He offered a reduction in the basic corporate income tax to 46 per cent, continuation on a permanent basis of the 10 per cent investment tax credit on purchases of machinery and equipment; and a special accelerated depreciation system on construction of new plant in high unemployment areas.

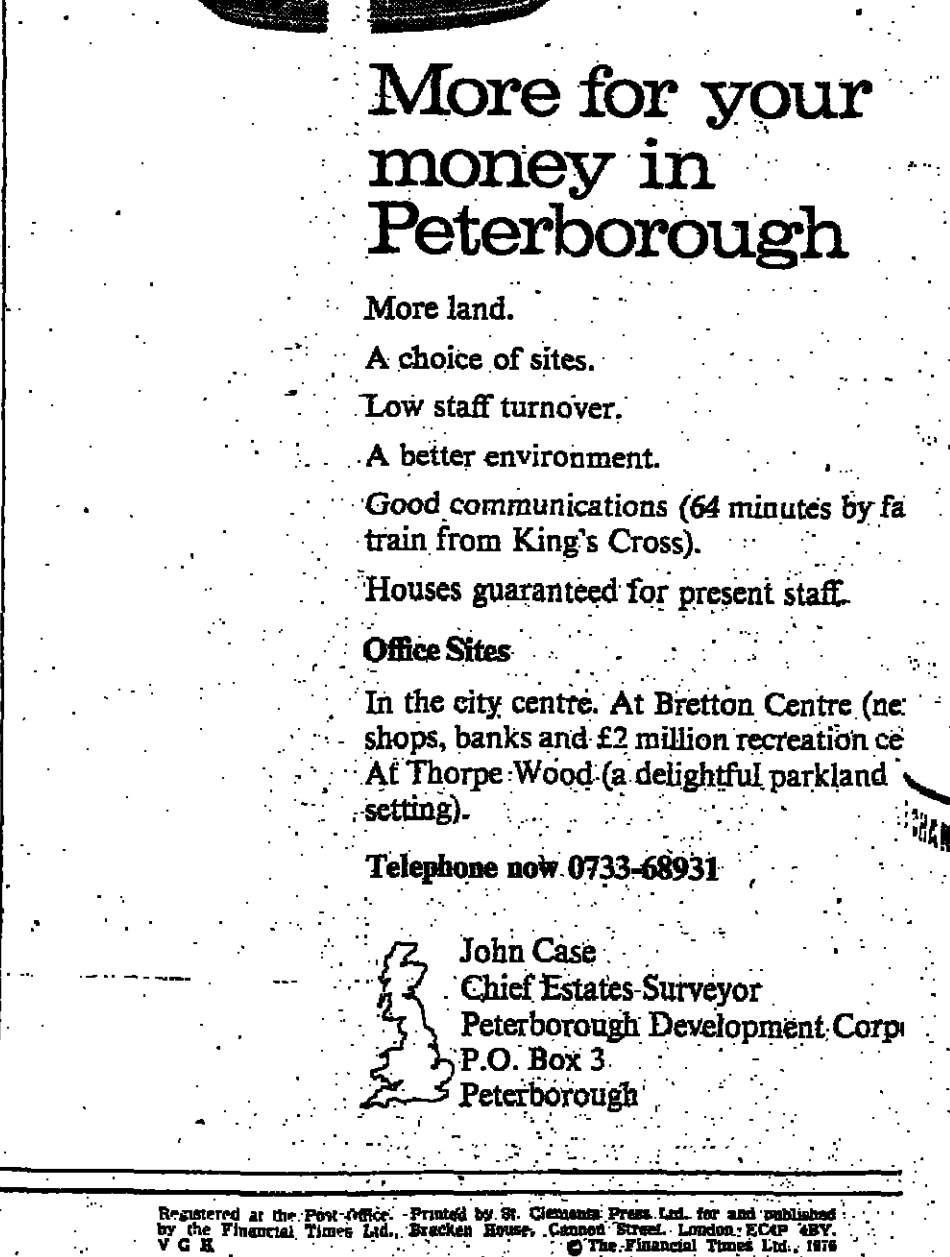
The White House believes that the incentives in this last proposal could be substantial. The criteria are that there must be at least 7 per cent out of work in the area concerned (the national unemployment rate is 8.3 per cent.) and that construction must start within a year from now.

The other mild surprise concerned Mr. Ford's stock purchase plan. Although lacking in precise details, it would provide a tax deferral for money invested in share purchase plans established either by individuals or companies for their employees if funds are invested in either common stock or unit trusts for at least seven years.

This proposal may not go down too well with the Democratic Party controlled Congress, which broadly believes that Mr. Ford did not do enough for America's poor in his State of the Union message, while catering for political reasons, for the more affluent.

Mr. Ford offered two other boosts for business—a programme to build housing and the easing of estate tax provisions which would make it easier for small farmers and businessmen to bequeath their assets to their children.

Editorial Comment, Page 14



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Weather

U.K. TO-DAY

SHOWERS. Snow on hills. London, S. England, E. Anglia, Midlands, S. Wales, Channel Is. Showers. Dry later. Wind W, fresh or strong, backing S.W. Max. 6C (43F).

N. and E. England, Lakes, N. Wales, L. of Man, Borders.

BUSINESS CENTRES

City	Temp	Wind	Clouds
Amsterdam	5	SE	100
Berlin	4	E	100
Brussels	5	E	100
Frankfurt	5	E	100
Geneva	5	E	100
London	5	W	100
Madrid	5	E	100
Munich	5	E	100
Paris	5	E	100
Rome	5	E	100
Stockholm	5	E	100
Vienna	5	E	100
Zurich	5	E	100

SNOW REPORTS

Snow on hills. Wind N.W., strong or gale, moderating, backing W. Max. 4C (39F).

Rest of Scotland

Frequent showers. Snow on hills. Wind N.W., severe gale at first, moderating and backing W. Max. 3C (37F).

Outlook: Showers. Night frost. Light-fog. London 16.35, Manchester 16.35, Glasgow 16.35, Belfast 17.05.

Advertisement for a company, featuring a logo and text in Arabic script.